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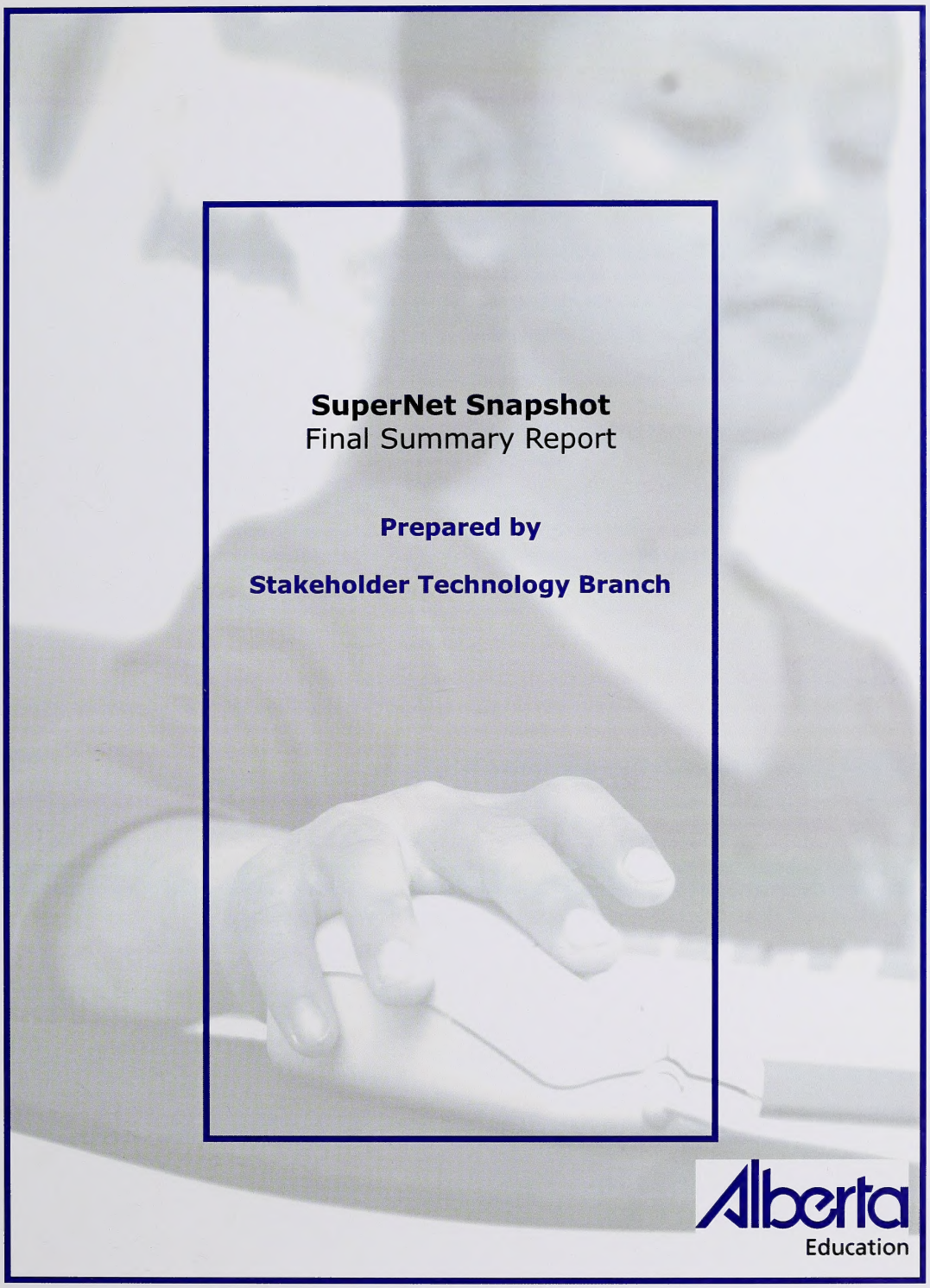

SuperNet Snapshot
Final Summary Report

Prepared by

Stakeholder Technology Branch

Alberta
Education

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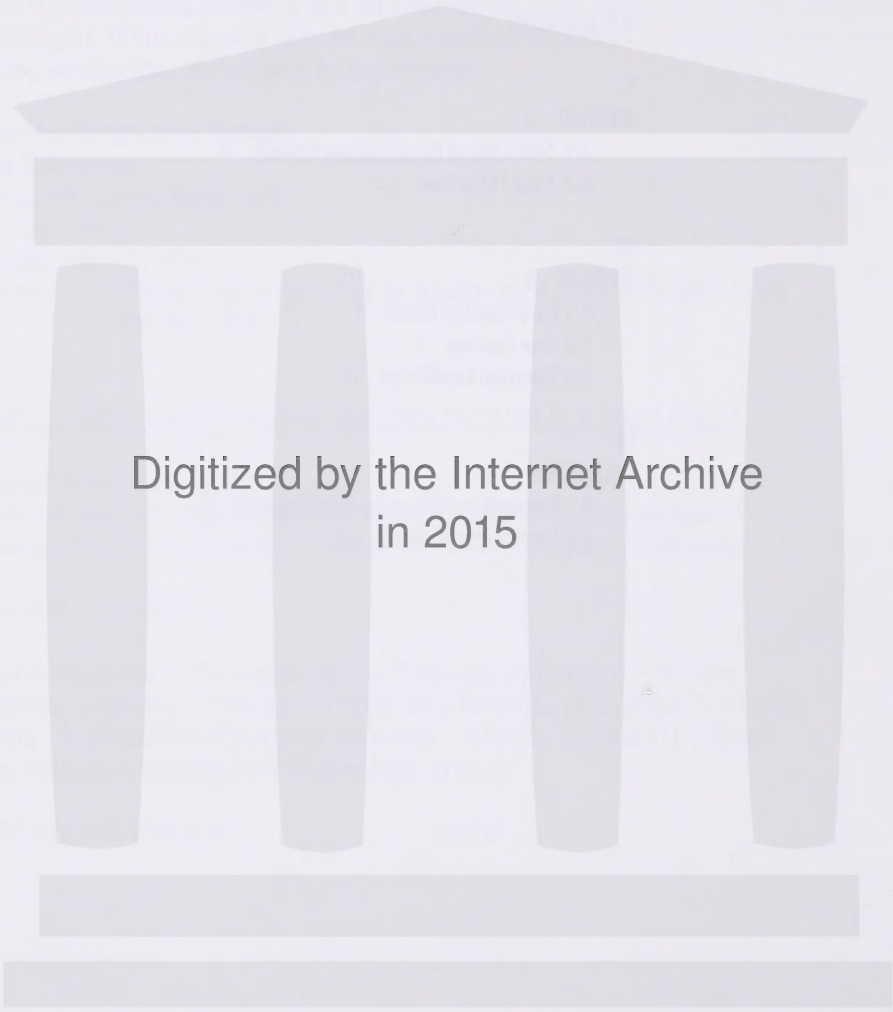

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Executive Summary

To investigate the impact of SuperNet on the education system in Alberta, Extension Learning Solutions undertook an investigation to provide a 'snapshot' of SuperNet use in several school jurisdictions across Alberta. In collaboration with Jurisdiction Technology Contacts (JTCs), Extension Learning Solutions selected 15 schools to participate in the SuperNet Snapshot. This collaborative process ensured that all schools selected for the SuperNet Snapshot research were actively using the SuperNet in a manner that provided an accurate impression of the system's capabilities. However, the involvement of JTCs in the school selection process could potentially have introduced a source of bias, due to the purposive nature of the sampling technique. Whether or not they were aware of it, JTCs might have selected schools within their jurisdiction that were more advanced in terms of technology integration and SuperNet use.

The research instruments used during the SuperNet Snapshot generated an overview of SuperNet use at each of the participating schools. In addition, data gathered at each of the 15 schools provided both a technical and pedagogical perspective of SuperNet use throughout the province. However, the main focus of the instruments was to determine to what degree the International Society for Technology in Education's (ISTE's) "Essential Conditions" (see Appendix) for technology integration were being met.

The overall impact of SuperNet on the schools was positive; all schools appeared to have benefited from access to SuperNet on varying levels, whether they simple used SuperNet's increased bandwidth to access online materials for instruction or whether access to SuperNet allowed them to deliver entire courses via videoconferencing. There was a great deal of variation between schools in terms of the sophistication of their technology integration; however, most of the schools had made advances in technology integration since SuperNet implementation. Although schools had made progress towards a higher degree of technology integration, the type of SuperNet utilization that researchers most frequently observed in the participating schools was basic Internet use (e.g., Google or Wikipedia searches). The range of use within schools in the study seemed to have resulted, at least in part, from varying levels of involvement from the schools' administration. Schools whose administrators had a clear direction for technology integration seemed to be able to better focus the school's resources and provided more effective support for teachers. In addition, variation observed between schools may have been due to the lack of a clear direction for technology integration at the jurisdictional level.

In general, schools had not completely met, but were making the most progress towards, the following Essential Conditions: Shared Vision, Equitable Access, Skilled Personnel, Technical Assistance, Content Standards and Curriculum Resources. Although these conditions were closest to being met, changes could still be made to better enable teachers and schools to successfully integrate technologies into teaching practice and make fuller use of SuperNet's capacity. Below are brief

descriptions of potential areas for improvement, followed by recommendations to better meet the Essential Conditions.

Shared Vision

- All participants appeared to be supportive of technology integration, although the presence of a clear direction at both the school and jurisdictional level was often lacking.
    - Focus on creating a clear direction for technology integration at the school and jurisdiction levels that is grounded in pedagogy and not driven by access to hardware.

Equitable Access

- Most respondents indicated that they would have benefitted from additional access to technology; however, all schools had at least a basic level of computing hardware available and SuperNet provided adequate network and Internet access. In this context, "a ***basic*** level of computing hardware" refers to the typical student to computer ratio of 6:1, which was referenced by participants in almost all of the participating jurisdictions.
    - Increase access to unconventional hardware (e.g., interactive whiteboards and videoconferencing equipment), in order to bring all schools to the same level of access. Focus on technologies with demonstrated pedagogical merit.

Technical Assistance

- Technical support for the purposes of maintaining reliable technical systems appeared to be sufficient; however, end-user support for hardware (i.e., desktops and other "in-class" tools) and software was lacking in a number of schools.
    - Increase technical assistance aimed at end-user support for teachers in the classroom; encourage teachers to take risks with unfamiliar technologies.

Skilled Personnel

- Teachers' skill levels varied greatly with regard to technology integration, ranging from teachers who used SuperNet in very sophisticated ways (e.g., conducting multi-point videoconferences) to teachers who had very limited knowledge of SuperNet and online resources. Several respondents also indicated that new teachers did not have the required level of technology training and sophistication.
    - Continue to foster the champion model of technology integration where possible, or obtain external assistance to support teachers.
    - Foster communication and collaboration within and between schools to share skills and knowledge.

Content Standards and Use of Curriculum Resources

- Teachers appeared to be knowledgeable in terms of content standards and curriculum resources; however, a more detailed examination of teaching

practice would be required to better assess this Essential Condition.

- Provide further communication to better publicize what digital curricular resources are available to teachers.

More work will be required in order for schools to fully address the following principles for successful technology integration outlined by the ISTE: Professional Development, Assessment and Accountability, and Support Policies.

Professional Development

- Teachers indicated that they have adequate access to formal professional development (PD) activities focused on technology or tool use; however, they felt that these PD activities did not adequately address the pedagogical application of the tools and did not effectively prepare them to integrate technology into their classrooms. Teachers also indicated that their time to attend PD activities was limited and technology-related PD was just one component of their ongoing PD needs.
    - Provide teachers with access to professional development that is differentiated, targeted, and focused on classroom integration.

Assessment and Accountability

- Systematic procedures to assess the effectiveness of instructional technologies were not in place at any of the schools.
    - Increase formal reflection on the effectiveness of technology for learning - during and following technology integration - to guide strategic planning and inform teachers' practice.

Support Policies

- Jurisdictions typically had policies in place to ensure a minimum level of hardware and technical support availability; however, there appeared to be a lack of clear direction for technology integration at this level. In some cases, policies related to filtering software and firewalls actually hindered rather than helped schools' progress in technology use and integration.
    - Emphasize the importance of school- and jurisdiction-wide solutions to issues surrounding SuperNet use and technology integration.
    - Jurisdictional support policies should give equal weight to the often competing needs of supporting technology integration and addressing legal and security concerns surrounding online resource use.

I
BACKGROUND

The Alberta SuperNet is a high-speed, high-capacity broadband network linking approximately 4,700 government offices, schools, post-secondary institutions, municipalities, child and family services, health-care facilities and libraries. Alberta Education continues to support jurisdictions as they transition to SuperNet connectivity by providing SuperNet IT Training and subsidizing training costs. SuperNet will expand and improve Albertans' access to e-learning opportunities regardless of where they live in the province. Videoconferencing and other broadband applications have been identified as having a high potential for use over SuperNet, giving schools more "reach to teach".

The SuperNet Snapshot research was intended to investigate the impact of SuperNet on the K-12 education system in Alberta. In the fall of 2006, Extension Learning Solutions conducted an investigation designed to provide a "Snapshot" of SuperNet use in 15 schools across the province.

In order to provide an area of focus for the SuperNet Snapshot, Alberta Education indicated that the research should make use of several indicators adapted from the International Society for Technology in Education's (ISTE's) "Essential Conditions". Extension Learning Solutions used these indicators to form research questions and develop appropriately targeted data collection instruments. The Essential Conditions will be discussed in more detail later in this report.

II
METHOD

2.1 Selection of Participating Schools

In consultation with Alberta Education, Extension Learning Solutions selected seven school jurisdictions across the province that would be asked to participate in the SuperNet Snapshot. In June of 2006, an initial communication was sent from Mat Hanrahan (Assistant Deputy Minister, Learning Supports Division) to the Superintendents of the seven school jurisdictions selected for inclusion in the SuperNet Snapshot:

- Calgary Board of Education
- Chinook's Edge School Division
- Edmonton Public Schools
- Foothills School Division
- Fort Vermillion School Division
- Parkland School Division
- Red Deer Catholic Regional Division

The initial communication served the following functions, it: provided Superintendents with a basic outline of the project objectives, introduced Extension Learning Solutions, provided general information about the proposed research activities, and indicated that the next step would be for Extension Learning Solutions to contact Jurisdiction Technology Contacts (JTCs) directly.

JTCs were selected as the main point of contact within each school jurisdiction because their overall knowledge of technology use in the jurisdiction enabled them to suggest schools that would be appropriate for inclusion in the SuperNet Snapshot. Each JTC was asked to suggest three schools within his or her jurisdiction – an elementary, middle/junior high, and senior high school – that would potentially be interested in participating in research surrounding SuperNet use. Responses from the JTCs generated a list of at least three schools in all but one of the seven jurisdictions selected for the study.

Extension Learning Solutions requested more than the required 15 schools because participation in the study was voluntary, and we anticipated that a portion of the schools would not consent to participate in the SuperNet Snapshot. Several schools were either unable (e.g., scheduling issues) or unwilling to participate, and the initial list of schools provided by the JTCs yielded a total of 15 participating schools.

A convenience sampling procedure was used to ensure that all schools selected for the SuperNet Snapshot research were actively using the SuperNet in a manner that provided an accurate impression of the system's capabilities. Although convenience sampling generated a list of schools that were actively using SuperNet, this method is more susceptible to bias than random sampling. In this case, the involvement of JTCs in the school selection process could potentially have introduced a source of bias, due to the purposive nature of the sampling technique. Whether or not they were aware of it, JTCs might have selected schools within their jurisdiction that were more advanced in terms of their technology integration and SuperNet use.

In order to generate a convenience sample, participants are selected from a population based on their ease of availability and appropriateness for the research question under investigation. In this case, ease of availability and appropriateness were defined as follows:

- **Ease of availability –** Institutions that were interested in actively participating in the SuperNet Snapshot project and working with the research team to ensure that required data were collected within the specified project timeline.
- **Appropriateness –** Institutions that were participating in broadband-enabled initiatives throughout the province of Alberta, or were independently taking advantage of SuperNet to incorporate broadband applications into the educational environment.

With the exception of the online teacher survey, all data collection activities were designed to be conducted during a site visit to each of the 15 participating schools.

Contacts within each school were asked to provide a schedule for the data collection activities prior to the site visit. Extension Learning Solutions worked with each of the schools in an attempt to minimize disruption and provide flexible scheduling options that enabled full participation from each of the schools.

Participation in each of the research activities was voluntary. While most schools participated fully in each of the SuperNet Snapshot data collection activities, other schools were only willing – or able – to participate in a subset of the research activities.

2.2 Data Collection

2.2.1 Background

Extension Learning Solutions developed a combination of quantitative and qualitative data collection instruments to gather information from teachers, administrators, technical support staff, and students. The instruments were designed to provide a snapshot of SuperNet use that represented both the technological and pedagogical perspectives in each of the 15 schools included in the study. While the content and focus of the various data gathering instruments differed, each was designed to address specific components of the International Society for Technology in Education's (ISTE's) "Essential Conditions", which are necessary for supporting the integration of technology into schools and classrooms. The nine Essential Conditions that were used to guide the development of the SuperNet Snapshot data collection instruments are:

- **Shared Vision:** The school board and school administrators provide proactive leadership in developing a shared vision for educational technology among school personnel, parents, and the community.
- **Equitable Access:** Students, teachers/staff have equitable access to current technologies (hardware/software), and resources.
- **Skilled Personnel:** District leaders, teachers and support personnel are skilled in the use of technology appropriate for their job responsibilities.
- **Professional Development:** District leaders and staff have consistent access to technology-related professional development for their job assignments.
- **Technical Assistance:** Personnel have technical assistance for maintaining and using technology.
- **Content Standards and Use of Curriculum Resources:** Teachers, Instructional personnel, and school leaders are knowledgeable about content and technology standards, related ICT curriculum and resources and the use of technology to support learning.
- **Student-Centered Teaching:** Teaching in all settings includes the use of technology to facilitate student-centered approaches to learning.
- **Assessment and Accountability:** The school and district have a system for the continual assessment of effective technology use for improving student learning.

- **Support Policies:** The school and district have policies, financial plans, and structures to support the use of technology in learning and in operations.

2.2.2 Data collection procedures

A brief description of each of the data collection instruments can be found below (see Appendix for complete instruments):

- **Online Teacher Survey –** The online teacher survey was made available to all teachers in each of the 15 participating schools. The instrument was designed to gather feedback in the following areas from a wide range of teachers: knowledge/comfort with online technologies, access and equipment, delivery, pedagogical approach, professional development, technical support, future SuperNet usage, and demographics.
- **Administrator interview –** The administrator interviews were conducted with either a principal or assistant principal at each of the participating schools. The interviews were meant to provide a better understanding of the strategic goals for SuperNet use within the schools, and also to address the administration's role in facilitating technology use in the school.
- **Teacher interview/focus group –** The format of this data collection activity was dependent on the number of instructors within each school who were able to participate in an interview. Extension Learning Solutions asked that at least one teacher participated in an interview at each of the participating schools. However, if more than one teacher was available at a school – and schedules did not allow for individual interviews – we conducted a focus group discussion with interested teachers. The instrument used was identical regardless of the format used. The teacher interview/focus group enabled Extension Learning Solutions to gather specific anecdotes of SuperNet use from teachers, and also to determine the factors that influence day-to-day SuperNet use in the classroom. The interviews focused on technical support, pedagogy surrounding SuperNet use, professional development, and barriers limiting the effectiveness of SuperNet use.
- **Technical staff interview –** Interviews were also conducted with technical staff to determine the overall layout, quantity, capacity, and accessibility of technology within the 15 participating schools selected for inclusion in the SuperNet Snapshot. While the content of this interview was mostly technical in nature, there was also a pedagogical component. Technical staff were asked to provide their opinions on issues such as the need for additional professional development, or technical support, to maximize the impact of SuperNet in the school.
- **Student survey –** After obtaining appropriate parental permission, the paper-based student survey was administered during the classroom observation period. In some cases, this was not possible because only a limited number of parental consent forms were returned on the day of the site visit. In these

instances, Extension Learning Solutions left the surveys with the teacher to be administered at a later date. The student survey was designed to work in combination with the classroom observation, to provide an understanding of the impact of SuperNet on students in K-12 educational environments. The student survey addressed: experience with technology, impressions of SuperNet applications, technical support, impressions of technology use, SuperNet use in the classroom, and demographics. Although Extension Learning Solutions had originally intended to administer the student survey to all students involved in the SuperNet Snapshot, we determined – after piloting the survey with a grade five class - that the complexity of concepts in the survey was not appropriate for elementary-aged students. Therefore, the student survey was only administered to students in grades 7 – 12.

- **Classroom observation –** Where possible, a classroom observation was conducted in each of the participating schools. During the classroom observation, research staff from Extension Learning Solutions viewed SuperNet application use in an actual educational context and recorded observations such as: the types of technologies used, expected learner outcomes, and student engagement with the technology.

Prior to participating in any of the data collection activities, participants were provided with a definition of SuperNet to ensure that all individuals had an adequate understanding of SuperNet. Participants were provided with the following information about SuperNet:

> ***Through SuperNet, Alberta will provide affordable high-speed network connectivity and Internet access to all schools... (http:://www.education.gov.ab.ca/technology/SuperNet/).***
>
> ***The SuperNet is designed to provide all schools with the capacity to use bandwidth intensive resources and technologies like streaming video, videoconferencing, or Flash applications. While some schools may have had commercial high-speed internet for several years, the SuperNet now provides high-bandwidth capability for all schools in the province.***
>
> ***For the purposes of this research, when we refer to "SuperNet" we would like you to think about both the high-speed network connectivity and associated high-speed Internet access provided by SuperNet.***

III
RESULTS

3.1 Participation Rates

In total, 15 schools participated in the SuperNet Snapshot. Of these 15 schools, five (33%) were in rural areas, and the remaining schools were in urban areas. The sample consisted of five (33%) elementary schools, four (27%) junior high/middle schools,

four (27%) high schools, and two (13%) K-12 schools.

Table 1 shows participation rates for each of the data gathering activities. Participation rates were generally high; in most cases, schools that agreed to participate were willing to participate in all aspects of the research.

Upon completion of the data gathering activities, Extension Learning Solutions performed a content analysis on qualitative data from the interviews, focus groups, and surveys. Quantitative data was entered into SPSS (Statistical Package for the Social Sciences) and descriptive and comparative analyses were performed.

Table 1

Data Collection Participation Rates

Activity	Participation rate (% of schools)
Online teacher survey	80
Administrator interview	100
Teacher interview/focus group	100
Technical staff interview	40[1]
Student survey	47[2]
Classroom observation	93

[1] A large portion of schools did not have a full-time technical staff member at the school. Technical staff interviews were not conducted unless the participant had an adequate working knowledge of the pedagogical implications of SuperNet access/use at the school.
[2] The student survey was not administered at elementary schools (except for the first school which was used as a pilot for the survey). The participation rate for junior and senior high schools was 60%.

3.2 Case Studies

3.2.1 Description of exemplar schools

When SuperNet use in the 15 schools was examined, three distinct prototypes of SuperNet implementation emerged. We have designated these three varieties as Genesis, Pilot-Project and Champion-Driven schools, with the names reflective of the key elements that made each school distinct. The Genesis school was in its infancy with respect to SuperNet usage; the Pilot-Project school was effectively using the SuperNet, but it seemed that the main impetus for SuperNet use was their participation in a pilot project, and innovative SuperNet use appeared to be confined to the scope of the pilot project; the Champion-Driven school was using the SuperNet mainly because someone at the school had an interest and/or skill with certain SuperNet applications and had championed their use at the school. Although these cases only deal with 3 schools, they reflect patterns that emerged in many of the other schools that were visited.

The case studies presented below are of actual schools that Extension Learning Solutions visited during the SuperNet Snapshot; the cases are **exemplars** of SuperNet use at a particular school, rather than a composite of SuperNet use at

several schools. The profiles of the three schools described in the case studies are not exclusive to these three schools. Aspects of each of the descriptions provided can be found in many of the other schools visited. The three prototypes described below are not mutually exclusive, and many of the schools participating in the SuperNet Snapshot exhibited different combinations of the attributes that defined the exemplar schools.

The case studies have been included to provide a more contextualized presentation of the research data, and to illustrate several barriers that constrained SuperNet use in many of the schools included in the SuperNet Snapshot. In order to maintain the anonymity of research participants, and to comply with the conditions of our University of Alberta ethical approval, we have removed the names of schools and individuals from the case studies. For ease of reading, we have used fictitious names in place of actual school and participant names.

3.2.1.1 Exemplar 1: Genesis School

Administrator's Description of the Genesis School's Technical Environment:

- 30 brand new desktop computers (PCs) were just purchased for the computer lab. Prior to this purchase the computer lab was equipped with out of date equipment.
- Created new "mini-labs" with desktop computers received from Computers for Schools.
- Created new "mini-pods" in classrooms with desktop computers.
- Some, but not all, areas of the school had wireless access.
- School was awaiting delivery of its first interactive whiteboard.
- School had been connected to SuperNet for approximately one year.

The "Genesis" school, which was located in a small rural community, provided K-12 instruction for approximately 350 students and housed a staff of 20.5 FTE (full time equivalent) teachers and eight support staff. Fewer than 100 students at the Genesis school were in grades 10-12. At the time of our site visit, the Genesis school's use of the SuperNet and its level of technology integration were quite limited, but expanding. This recent trend was due, in part, to its relatively recent connection to SuperNet, coupled with additional funding the school received to purchase computer equipment. The school's principal, Mr. Descartes, provided some background on the Genesis school's current state of technological integration and indicated that he felt technology was traditionally under-funded at the school:

> ***... That means things like technology typically go to the back burner. It was just in this current school year, in this current budget year, that we actually were given enough money to fulfill a technology plan.***

An observation of activities occurring in the computer lab affirmed Mr. Descarte's comments. The students were working on articles for their school newspaper.

Some, were using the Internet to search for pictures, while others were putting their content into word processing software. One student was responsible for compiling the data and putting it into publishing software, as the teacher indicated that the other students did not possess these skills. Students did not appear to be particularly focused on the task at hand; some students were using instant messaging and others were playing games. These observations provided a sample of the limited SuperNet use and lack of technology integration noted at the Genesis school. Although Extension Learning Solutions observed limited technology integration, Mr. Descartes seemed optimistic about future technology and SuperNet use at his school. He mentioned that effective pedagogy and technology integration would follow access to adequate technology within the school, which suggests that the Genesis school was at the beginning of a period of transformation that would lead to increased use of both technology and SuperNet's capacity. However, at the time of our site visit, technical knowledge was still a barrier at the Genesis school.

Two teachers at the Genesis school were able to meet with Extension Learning Solutions and discuss their thoughts about SuperNet usage at the school and in their classes. Mr. Turing and Mrs. Rawls were both very experienced teachers who seemed interested in the pedagogical potential of SuperNet access; however, they identified limited technical knowledge within the school as a major constraint that restricted their ability to make full use of SuperNet's potential. Mrs. Rawls, for example, was formerly a grade one teacher, and due to limited staffing, she had been asked to take on the role of technology expert within the school. Although Mrs. Rawls indicated that she had taken several courses in order to increase her knowledge of various technologies, she felt that further training for her and her colleagues would greatly increase their ability to incorporate SuperNet use into their classes. The level of awareness and knowledge of SuperNet at the Genesis school was succinctly described by Mrs. Rawls,

> ***We didn't know we had SuperNet. . . when [Mr. Descartes] asked me to do this interview, I said 'what's SuperNet?***

According to Mrs. Rawls and Mr. Turing, their restricted knowledge of SuperNet limited their ability to assess the potential of SuperNet use for their classes.

Although the Genesis school's exact circumstances were unique among the 15 schools involved in the SuperNet Snapshot project, several of the barriers that limited SuperNet use at this school (e.g., access to computers and other hardware, access to PD, and technical knowledge) were present at other schools that Extension Learning Solutions visited.

The Genesis school initially suffered from inadequate access to technology; however, when adequate hardware and bandwidth (through SuperNet) became available, the limiting factor became the lack of technical knowledge at the school. As indicated by Mr. Descartes, effective technology use trails adequate access to technology. This pat-

tern was repeated at several schools that were not able to make full use of SuperNet because they did not have adequate access to the necessary hardware and/or technical knowledge.

The Genesis school was quite limited in its level of technological integration. It seems probable that this was largely due to inadequate access to technology and lack of technical knowledge, but it also appeared that there was no one spearheading the drive to integrate technology. The cumulative effect of these three barriers was such that the school was just beginning to integrate technology.

3.2.1.2 Exemplar 2: Pilot-Project School

Administrator's Description of the Pilot-Project School's Technical Environment:

- School had one computer lab with approximately 25 desktop computers (PCs).
- School also had one interactive whiteboard, which the administrator suggested was under-utilized.
- The school made extensive use of a permanent videoconferencing suite for the delivery of senior-level courses.

The Pilot-Project school was situated in a rural area and housed a staff of approximately 16 FTE teachers and 160 students in kindergarten through grade 12. The school had been involved in a province-wide videoconferencing pilot project. As indicated by Mr. Hume, the school's principal, the Pilot-Project school's use of videoconferencing was designed to address some of the course delivery barriers present in many small rural schools:

> ***it's [videoconferencing] for schools like ours that have a smaller high school population. We basically pool all of the teachers in a school division to teach a course.***

The Pilot-Project school's participation in the province-wide videoconferencing project provided the technical and financial support required to implement a full videoconferencing suite at the school. The videoconferencing pilot project also appeared to have provided the impetus for the school to make use of SuperNet's capacity to address an educational need within the jurisdiction (i.e., improved access to courses and efficient use of teaching resources at the high school level).

Although participation in the videoconferencing project enabled the Pilot-Project school to make very effective use of the SuperNet's capacity, the school's overall level of technology integration – aside from videoconferencing use – was actually relatively limited. Mrs. Dewey, a teacher at the school, indicated that the potential of the SuperNet at the school was not being reached due to access issues, ***"it's got wonderful potential, but it's not being used…there is a lab in this school, it's a 25 seat lab, but we have 12 grades"***. Mrs. Dewey went on to describe how limited access to computers in the school impacted teachers' abilities to address ICT outcomes in the curriculum and created a situation where teachers were unable to make use of SuperNet's potential

in their classes.

The Pilot-Project school presented a very clear picture of how the funding, expertise, and motivation provided by a pilot initiative such as the videoconferencing project can enable a school to implement technological solutions to barriers created by location or school size. The school's use of SuperNet for videoconferencing was more extensive, and more routine, than any other school participating in the SuperNet Snapshot. Rather than being seen as an "event" at the school, the videoconference we observed on the day of the site visit appeared to be a very routine experience for the participants. The students at each of the sites interacted with the teacher – and with each other – in a manner not unlike a traditional face-to-face class. The level of student engagement with the material seemed typical of a high school class, and the delivery method did not appear to create any major complications for the students involved in the videoconference. Although the school's use of SuperNet for videoconferencing was very extensive, it did not appear that this extensive use of SuperNet generalized to other activities within the school. According to Mrs. Dewey, in most cases technology integration was limited to basic Internet usage (e.g., Google searches).

As with the Genesis school, there appeared to be barriers that limited the impact that SuperNet implementation had in the school. Although the Pilot-Project school displayed a higher level of technological integration than the Genesis school, the use of technology was not ubiquitous, nor did there seem to be any innovative use of SuperNet beyond the scope of the videoconferencing pilot project. That is to say, although the Pilot-Project school was making effective use of SuperNet for video-conferencing, this level of use did not appear to generalize to other activities or other classes at the school.

This pattern was observed at other schools as well. Schools may have the budget or the technical means to implement technology; however, as seen in the Genesis school, simply having the technology does not mean that integration will flow auto-matically.

3.2.1.3 Exemplar 3: Champion-Driven School

Administrator's Description of the Champion-Driven School's Technical Environment:

- School had three computer labs with approximately 100 desktop computers.
- Mobile videoconferencing unit was available to all teachers.
- School did not have access to interactive whiteboards.
- There were several data projects available at the school; one projector for each department at the school.
- All teachers had access to a computer in their classroom.

The Champion-Driven school housed approximately 1,000 students in grades 10

through 12. The school was in a large urban centre and catered to a varied student demographic which included a large percentage of ESL and special-needs students. Mr. Hobbes, the school's principal, was excited about the prospect of making use of the SuperNet's capacity, and indicated that videoconferencing was a current and future area of focus at the school. Although some teachers at the school had been making use of the SuperNet's capacity for videoconferencing and other bandwidth-intensive technologies, Mr. Hobbes indicated there was a significant range in the extent to which individual teachers were integrating technology into their classes. Mr. Hobbes felt that overall technology use at the school had increased from the previous year, and suggested that for his school, a champion model was the most appropriate way to generate additional interest in technology integration and SuperNet use:

> ***...the only way my staff are going to become aware of the virtual classroom and using the SuperNet was if somebody took the time to either train themselves or go to some PD where they learned how to use it and then they are now teaching the rest of them [teachers at the school].***

When Extension Learning Solutions arrived at the school for the SuperNet Snapshot site visit we were met by Mr. Locke, a teacher at the school who helped organize our site visit and acted as the lead contact for the SuperNet Snapshot research. Mr. Locke was a young, energetic teacher who was a relatively new addition to the school's staff. Mr. Locke had experience with videoconferencing prior to coming to the school, and his enthusiasm and expertise appeared to be a vital component of the school's videoconferencing implementation. Mr. Locke felt that,

> ***The SuperNet has opened up the living textbook...it's living, it's growing, it's changing, it's evolving... it's also living in the sense that we are now able to contact the people who are doing it [science or research].***

His experience with videoconferencing, and strong belief in the pedagogical benefits of SuperNet, positioned Mr. Locke to be an excellent champion for SuperNet use at the school. However, Mr. Locke stressed that the recent successes the school had experienced with the use of videoconferencing would not have been possible without extensive support – both in terms of adequate technology and human resources – from the school's administration.

In the case of the Champion-Driven school, the school's principal provided Mr. Locke with the time and resources required to plan and execute several videoconferences ranging from point-to-point presentations by a researcher to multi-point events involving several schools across Canada. On the day of our site visit, Mr. Locke had organized a multi-point videoconference on behalf of the school's music teacher. Mr. Locke handled the initial set-up of the videoconference and when connection problems occurred, he worked with a jurisdiction employee to ensure that the technical issues were addressed in a timely manner. The videoconference provided a forum for

music students at the school to showcase their talents to several other high schools across Canada. The level of student engagement was very high, and the students seemed to be genuinely interested in sharing their skills and enjoying performances by the other schools. The videoconference appeared to be an excellent example of how the SuperNet can create a "living classroom" and allow students' educational experiences to reach beyond the four walls of their school. However, the researchers were left with the distinct impression that the videoconference would not have been possible without the expertise and enthusiasm of Mr. Locke.

Mr. Locke provided technical support and models of appropriate SuperNet use. He also acted as a clearing house for examples of potential videoconferencing events, which were targeted at specific curricular areas and levels of student ability. Mr. Locke's knowledge and support enabled teachers at the Champion-Driven school to make better use of the capacity of SuperNet by incorporating videoconferencing into their teaching practice. The Champion-Driven school is an exemplar of a pattern that Extension Learning Solutions saw repeated across several schools: a dedicated and skilled "champion" - whether they were an administrator, teacher, or technology integration assistant – acted as a catalyst for SuperNet use at the school. These champions appeared to drive the technology integration process by providing technical and moral support for teachers who were moving towards increased SuperNet use in their classes.

In contrast to the previous two case studies, the Champion-Driven school had adequate resources, technical support, and knowledge and also had someone at the school that was able to drive innovation and explore new ways that technology could be implemented. As a result, the Champion-Driven school exhibited the highest levels of technology integration, as well as the most impressive uses of the SuperNet in support of pedagogy. This is not to imply that there was no room for future integration at the school; however, relative to other schools, the Champion-Driven school had advanced dramatically.

3.2.2 Discussion of Case Studies

The Genesis, Pilot-Project, and Champion-Driven schools are representative of patterns that the researchers witnessed throughout the 15 schools involved in the SuperNet Snapshot. Although each of the schools was actively working to integrate technology into instructional practice, various barriers limited what may have been possible in terms of technology and SuperNet use. The case studies illustrate that several factors appear to play a major role in the extent to which schools are able to make effective use of SuperNet.

As would be expected, "adequate" access to technology has a major influence on a school's use of SuperNet. If teachers do not have sufficient access to technology to make it a regular and meaningful component of their instruction, it will hamper not only the frequency with which they make use of SuperNet, but, as illustrated by the

Genesis school, it will also affect the level of SuperNet use (i.e., sophistication of online technologies and resources employed). The definition of adequate is necessarily subjective, and most teachers indicated that additional access to technology would be beneficial; however, the Genesis school demonstrates that there are still instances where insufficient access to technology plays a significant role in limiting SuperNet use.

Schools like the Pilot-Project school had adequate infrastructure, hardware, and technical knowledge to make effective use of the SuperNet; however, their use of the SuperNet did not seem to generalize beyond the scope of use defined by participation in the pilot project. This appears to be partially due to the lack of a champion within the school, or someone who could drive and direct the use of the SuperNet and lead new initiatives. As a result, what emerged seemed to be limited use of the SuperNet; it was being used, and in some cases used very effectively, but there had been little innovation in practice. In this case, without someone to lead or champion the use of the SuperNet, the technology integration process stagnated.

Schools similar to the Champion-Driven school had adequate, or close to adequate, infrastructure and hardware. They also had sufficient technical knowledge/support and a champion within the school to direct and lead the implementation and use of the SuperNet. As a result, SuperNet use in these schools tended to be much more advanced than in other schools. In addition, the use of the SuperNet was often not just more frequent, but it was also much more innovative and imaginative than was observed in the other types of schools. Having a champion, in addition to adequate infrastructure and technical knowledge, seems to be an important determining factor in how, and to what extent, the SuperNet is used.

In cases where a champion was present and the SuperNet was being used effectively, the schools seemed to be very dependent upon the champion to drive the use of the SuperNet. Champions within the school were essential for several reasons: 1) they enabled staff at the school to understand the potential of SuperNet, 2) they provided formal and informal technical support to other teachers in the school, 3) they often provided pedagogical support, either through modeling appropriate usage or providing examples of effective practice, and 4) they often enhanced acceptance of innovative teaching practices and created an environment where other teachers were excited to make use of online tools and resources. Eventually, it would be hoped that others in the school would begin to accept some of the responsibility and that the excitement and enthusiasm would spread. Perhaps this is the next step in the process; that is, developing communities of practice within schools or jurisdictions in order to further expand the use of SuperNet and other technologies.

3.3 Essential Conditions

3.3.1 Descriptive Data

3.3.1.1 Background

The data collection instruments for the SuperNet Snapshot were designed to address nine of the Essential Conditions for technology integration identified by the ISTE. Typically, questions pertaining to each of the Essential Conditions were included on more than one of the instruments described above (e.g., teacher survey and administrator interview). This served the dual purpose of ensuring that the instruments reliably assessed each of the essential conditions, and that in most cases both quantitative and qualitative data related to each of the essential conditions was collected.

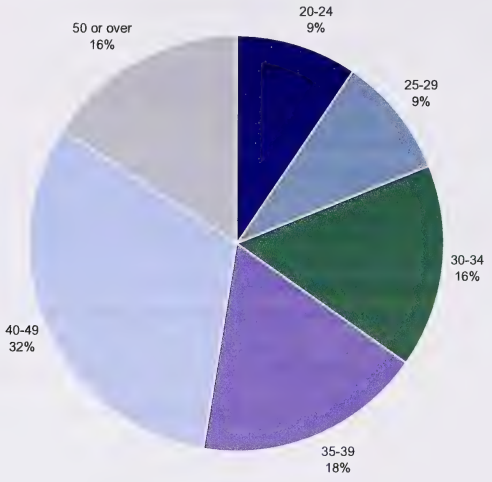
The following essential condition summaries include data from the teacher, administrator, and technical staff interviews, as well as data from the student and teacher surveys. In total, Extension Learning Solutions conducted 15 administrator interviews, 15 teacher interviews, and 6 technical staff interviews. There were also 105 responses to the teacher survey and 253 responses to the student survey. Unless otherwise noted, the use of the term "respondents" refers to individuals who participated in a teacher, administrator, or technical staff interview. **Where applicable, questions displayed in tables and figures in this report are ranked by response mean in ascending order.**

3.3.1.2 Teacher Demographics

Teacher survey respondents were predominately female (63.5%) and a very large majority (91.7%) of respondents indicated that they taught in an urban, rather than rural, context. The preponderance of responses from teachers in urban settings is likely due to several factors: 1) approximately two thirds of the schools participating in the SuperNet Snapshot were in an urban setting, 2) urban schools tended to have a larger number of staff, and therefore, a larger number of potential respondents, and 3) most of the rural schools had poor response rates. The average teacher survey respondent had been teaching for 12 years (M=11.99, SD=9.24) and using technology/Internet in their classes for approximately seven years (M=6.91, SD=4.99). Figure 1 displays the age breakdown of teachers responding to the SuperNet Snapshot teacher survey.

Figure 1

Teacher Survey Respondent Age Breakdown



3.3.1.3 Student Demographics

In contrast to the teacher survey respondents, the gender breakdown of student survey respondents was almost equal; 51.2% of student survey respondents were female and 48.8% were male. However, the split between urban (94.02%) and rural (5.98%) student survey respondents was approximately equivalent to that of the teacher survey. The factors that led to the skewed urban/rural student survey respondent breakdown were likely similar to those discussed previously in reference to the teacher survey respondents.

ISTE Definition of Shared Vision: The school board and school administrators provide proactive leadership in developing a shared vision for educational technology among school personnel, parents, and the community.

3.3.2 Shared Vision

Respondents appeared to be universally supportive of technology integration and SuperNet use for instructional purposes. In all cases, technology integration was taken for granted, in the sense that administrators and teachers appeared to accept that technology use was essential in modern educational settings. In general, teachers and administrators were able to articulate benefits of technology implementation, and they often provided specific examples of their vision for technology integration and SuperNet use. For example, administrators at a majority of the schools were able to highlight the myriad ways in which they were supporting technology integration and SuperNet use, by: directly promoting the use of specific technologies, providing adequate access to technology, providing adequate access to technical support, and engendering an environment where experimentation and innovation were encouraged. Although components of shared vision – as defined by the ISTE – were present in essentially all of the 15 schools included in the SuperNet Snapshot, the degree to which administrators were able to describe a coherent plan for technology integra-

tion at their schools varied greatly. The following three quotations are examples of respondents' comments that indicate different visions for technology integration:

> ***We have a technology plan, I have resources, I've got a department head of CTS…we have a tech guy as well, so we have a link with [District] ITS…have a technician that comes in once a week, plus I have a teacher with time that is spent developing that technology plan, implementing that plan, and making those decisions in conjunction with me…from how much money should we spend just on the hardware, software, how are we going to implement technology within our classrooms…***

> ***I don't know if I can say if there's a technology plan, I know the plan basically is to bring in…like we brought in more [interactive whiteboards], depending on how many people want to use it, how often…I know we're looking at getting a new laptop lab…as technology gets used more and more I think that's where our plan heads, rather than this is what we're going to be doing because its great to have a plan, but if no one's using it, or no one's doing it, then where are we going and what's the purpose of buying all of this stuff.***

> ***We do have a tech committee that looks at, kind of, future directions for the school division, to go in, we also work in conjunction with a district plan that says, you know, you're going to get new computer in this lab, on this date…but with respects to our present technology plan, one of the…major initiatives of it was to put the technology in the departments, so we took a look at each department and said, "you can have $2000 worth of technology"…so we left it up to each department to determine where and what kind of technology they would use…***

At a basic level, the ISTE defines shared vision as the "presence of proactive leadership and administrative support, shared vision means that the commitment to technology is systemic". It appears that some elements of the characteristics necessary to achieve this essential condition were present in each of the schools participating in the SuperNet Snapshot. However, schools where an administrator was able to articulate a specific and coherent plan for present and future technology use appeared to be more advanced in terms of their level of technology integration and overall use of SuperNet.

Schools with strong direction from an administrator, rather than just general support for technology use, tended to be more focused in their use of technology which often led to more advanced use of SuperNet (e.g., videoconferencing). By focusing attention and resources on certain technologies, administrators can ensure that the necessary support systems are in place so that teachers can more effectively implement these specific technologies in their classes. With a more focused technology integration plan, teachers can also benefit from the support and direction of their colleagues, who will be working toward the same common goal. Although strong

direction from an administrator appeared to be a major factor influencing a school's level of technology integration, this type of administrative vision appeared to be present in less than half of the schools participating in the SuperNet Snapshot.

In some instances, administrators were supportive of technology integration and recognized its value, but did not provide direction in terms of the specific technologies to be implemented at the school. These administrators tended to create an atmosphere where technology use was encouraged, but they often left the specifics of technology integration to the teachers. In comparison to the more directed technology integration approaches, this approach typically did not provide the same degree of formal and informal support for teachers attempting to incorporate technology into their instruction.

Although elements of the shared vision Essential Condition appeared to be present in each of the schools involved in the SuperNet Snapshot, there were differences in levels of integration based on the amount of leadership and direction provided by administrators.

Highly involved administrators that focused a school's attention on specific technologies seemed to be more successful in promoting and supporting technology integration and associated use of SuperNet.

ISTE Definition of Equitable Access: Students, teachers/staff have equitable access to current technologies (hardware/software), and resources.

3.3.3 Equitable Access

Teachers indicated that they were using SuperNet for the following: videoconferencing courses, email, report cards, database research, professional development, learning management systems, finding resources, demonstrations, simulations for students, posting assignment details or grades on websites, and for accessing the LearnAlberta.ca website.

Students indicated that they were using SuperNet for the following: database research, Internet searches (for pictures, videos, etc), blogs and chat rooms, accessing school websites, email, study games, and various kinds of software that teachers have incorporated into the curriculum for activities such as poetry-writing.

Since the inception of the SuperNet in Alberta, respondents indicated that their connection speed has significantly increased, which allowed them to incorporate ICT into their teaching in new ways, such as: using interactive whiteboards, offering videoconferencing courses, and showing students simulations and demonstrations in their classes. Not only did respondents indicate that their connection speed had increased since SuperNet implementation, but only 8.5% of teacher survey respondents felt that their connection was less than "somewhat adequate"; a majority (55.3%) of respondents felt that the speed of SuperNet was "adequate" or "very adequate" for their needs. Respondents also indicated that the SuperNet had allowed for increased opportunities to connect with other schools. However, certain jurisdictions have firewalls or filtering software, which hamper teachers' attempts to

integrate technology and incorporate new resources and tools. For example, several teachers indicated that jurisdiction firewalls made it very difficult to videoconference with other schools, and more than one teacher commented that filtering software hampered their ability to access useful Internet sites such as Google images.

In addition to the fact that the majority of teachers surveyed indicated that the speed of SuperNet was either "adequate" or "very adequate", respondents also indicated that download speed was the most important attribute of SuperNet for their teaching context (see Table 2). Although download speed was considered very important, teachers indicated that several other attributes of SuperNet were also important in their teaching context.

Table 2

Teacher Ratings of the Importance of SuperNet Attributes

Table 2: How important are the following SuperNet attributes for your teaching context? (teacher survey)

SuperNet Attribute	Rating				
	Not at all Important (1)	(2)	Somewhat Important (3)	(4)	Very Important (5)
Ability to audioconference over SuperNet	24.2	24.2	33.3	7.1	11.1
Ability to videoconference over SuperNet	22.7	26.8	27.8	10.3	12.4
Ability to access interactive animations/simulations	7.2	8.2	15.5	19.6	49.5
Ability to stream high quality video	6.3	4.2	14.6	24.0	51.0
Quick download times	4.0	1.0	6.1	20.2	68.7

Respondents report that faster and more consistent access to the Internet has also benefited students' learning in a number of ways (this will be discussed further in a later section of the report). Student access seems to be primarily dependent on the amount of equipment at the schools, but also on the skill level of the teachers. If teachers do not have adequate knowledge to effectively integrate technology in their teaching, then regardless of whether technology is available, it will sit unused or will not be appropriately used (e.g., an interactive whiteboard used as a traditional whiteboard).

In terms of their personal access to computers, teachers typically had either their own desktop computer in the classroom or access to a laptop. In addition, a majority of respondents to the online teacher survey indicated that computer access (69.3%) and computer equipment (75.2%), for instructional purposes, at their schools were at least "somewhat adequate". Access to technologies such as interactive whiteboards, projectors, videoconferencing equipment, etc. varied by school, and in most cases, reflected the needs of the school. For example, a large, urban school was well-equipped for videoconferencing as they used it to videoconference with smaller rural schools who were suffering from a shortage of teachers in certain subject areas.

However, some schools indicated that although they had the basics in terms of

computing hardware, as computer usage increases, so will the demands for additional computing resources and lab space. Schools had various needs for additional equipment, which reflected the needs of their student base. For example, one school indicated that additional interactive whiteboards would help special needs students learn as they would provide more stimulation than a teacher's lecture.

When asked their ideal vision for SuperNet use, most respondents indicated that they would like to see increased access for students, ideally a one-to-one student to computer ratio. Figure 2 displays teacher survey participants' responses to several questions addressing the adequacy of their access to various technologies. Teachers were asked whether they agreed or disagreed that they had adequate access to the six items listed in Figure 2.

Figure 2
Teacher Ratings of Adequacy of Hardware Access

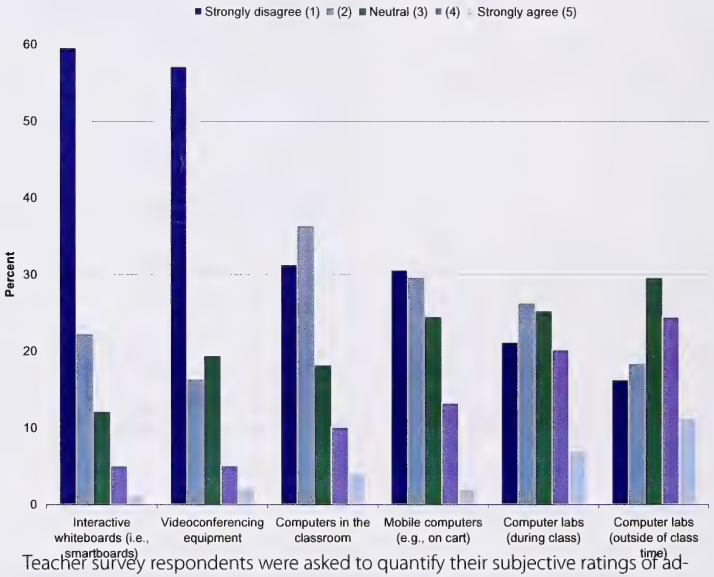


Figure 2: Would you agree that your classes have adequate access to the following types of computer resources? (teacher survey)

Teacher survey respondents were asked to quantify their subjective ratings of adequacy by indicating how many hours per week they had access to computers in a lab setting. Responses ranged from 0–30 hours per week, and the median response was Mdn=1; almost half of teachers (40.2%) indicated that they had approximately one hour of access per week. Teachers also indicated that within the lab setting, the median ratio of students to computers was 1:1. Regarding access outside the lab setting (e.g., mobile computing stations or computers in the class) responses were more varied, with teachers generally reporting greater levels of access. Responses ranged from 0 – 40 hours, but a majority of teachers indicated they had between 0–4

hours/week of computer access – for instructional purposes - outside a lab setting; the median response was Mdn=3.5.

Although teachers had access to computers – for instructional purposes - outside the lab setting for a greater number of hours per week, the ratio of students to computers (Mdn=2.0) was double the ratio present in the lab setting. The items above address hours of regularly scheduled computing access per week. When asked how difficult it was to schedule ad hoc computer access when needed, the average response from teachers was "somewhat difficult".

Students' overall impressions of the adequacy of access to various technologies were somewhat similar to teachers' responses. With the exception of access to computer labs (both during and outside of class time), students generally did not agree that they had adequate access to technology within their school (see Figure 3).

Figure 3

Student Ratings of Adequacy of Hardware Access

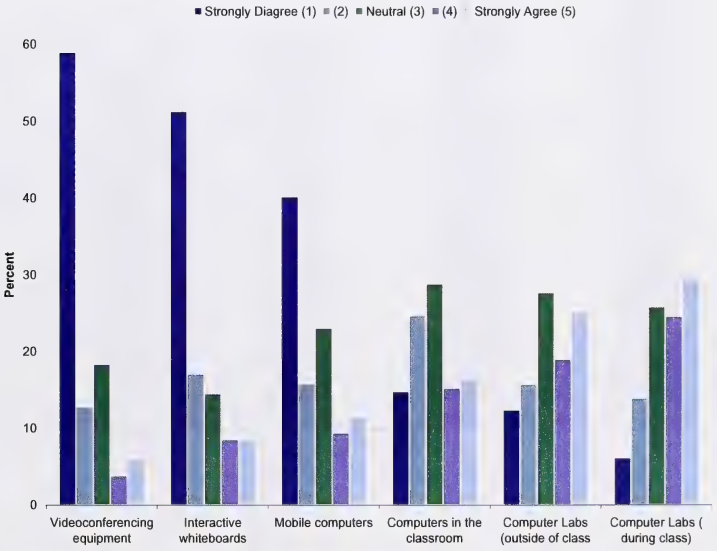


Figure 3: Do you agree that you have enough access to the following types of computer equipment? (student survey)

Students generally indicated that they did not have adequate access to technology. However, in comparison to teachers, students tended to rate their access to technology slightly more favourably. On average, students also showed a slightly different pattern of responses than teachers. Figure 3a displays students' and teachers' adequacy of access ratings for the six types of computing resources currently under examination.

Figure 3a

Student and Teacher Ratings of Adequacy of Hardware Access

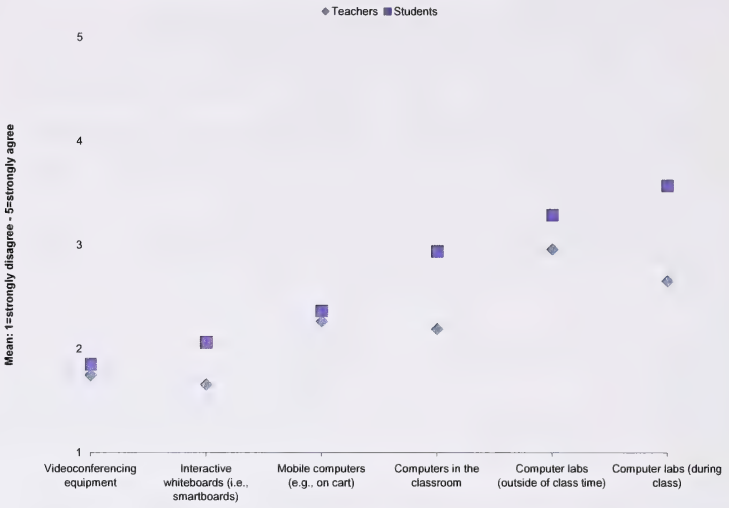


Figure 3a: Combination of figures 2 and 3. (student and teacher surveys)

Teachers had varied perceptions of which technologies were most important in order for them to make "full use" of SuperNet in their classes. However, technologies that allowed teachers to share online resources with their students were generally rated as important additions to the classroom (see Figure 4).

Figure 4

Teacher Ratings of Importance of Access to Technologies

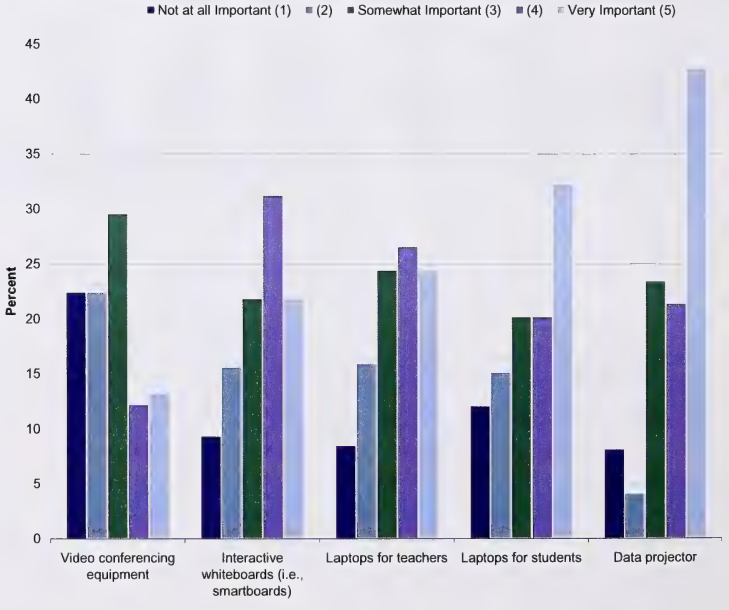


Figure 4: In order to make full use of SuperNet, how important is access to the following types of technology in your classes? (teacher survey)

Although laptops were considered an important technology for making full use of SuperNet, only 26.7% of teachers indicated they had access to a laptop "whenever needed"; a majority of teachers either had no access to a laptop (30.7%) or had inconsistent access to a laptop (42.6%). The applicability of laptops in the context of SuperNet use is closely linked to the availability of Wi-Fi connections within the school. Several schools involved in the SuperNet Snapshot had either implemented Wi-Fi or were considering a Wi-Fi implementation in the near future. Figure 5 displays teachers' responses to several questions asking them to indicate in which areas of their school Wi-Fi is currently available, or where there are plans to implement Wi-Fi in the future.

Figure 5

Current and Planned Access to Wi-Fi

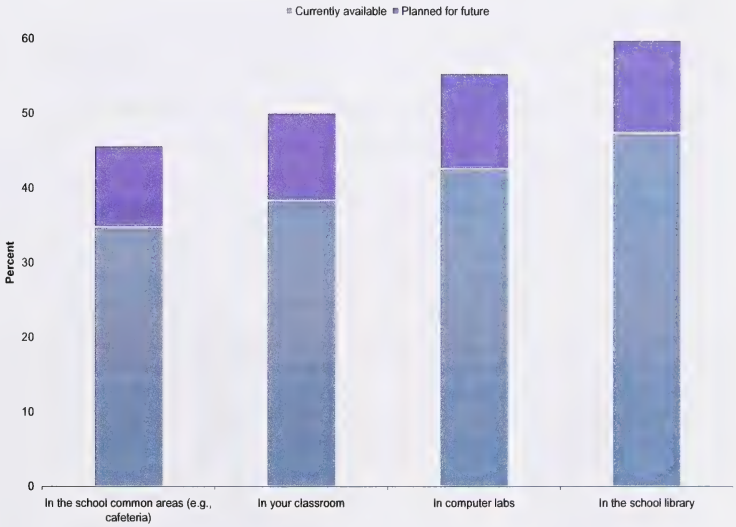


Figure 5: Do you have wireless access to SuperNet, and your school's internal network, in the following locations? (teacher survey)

Participants' perceptions of whether they have adequate access to technology appear to be related to the interest and skill levels of teachers at the school, and also to whether the school has an overall plan for technology implementation and integration.

Schools that indicate higher usage levels tend to have experienced teachers and/or a technical support person within the school to help teachers with the implementation, and an administrator who is enthusiastic about technology integration. For example, one respondent indicated that:

> ***Access at our school is almost impossible…you have an aggressive staff who wants to use technology…so what ends up happening is, you end up going 'old school' with your lessons, you just have to…the problem I don't think is the skill…I know for myself, I could [continued on next page]***
>
> ***be on them all day, like doing different things and setting up lessons and doing web based stuff and…which would totally enhance the way that I teach and the things that I want to teach, but its an impossibility.***

Another respondent indicated that his or her school had not yet taken advantage of the SuperNet as teachers lack the time to learn about the technology and how to incorporate it into their curriculum.

ISTE Definition of Skilled Personnel: District leaders, teachers and support personnel are skilled in the use of technology appropriate for their job responsibilities.

3.3.4 Skilled Personnel

Overall, respondents indicated that there is a range of skill levels with the use of technology among teachers, but that most teachers are interested in learning more about the use of technology for instruction because they can see its positive effects on student learning. One of the most significant constraints limiting teachers' knowledge of technology was reported to be their lack of comfort with using new technologies. Although interview participants cited low comfort level as a barrier to technology use, a majority of respondents to the teacher survey indicated they were "comfortable" (29.3%) or "very comfortable" (29.3%) using technology for instructional purposes. This suggests that there is a split between teachers who are comfortable using technology for instructional purposes and those who are not; almost a third of teacher survey respondents were only "somewhat comfortable" (28.3%) using technology and 13.1% were less than "somewhat comfortable". Anecdotal evidence often suggests that comfort with using technology for instructional purposes is related to factors such as age or teaching experience. However, there were no statistically significant differences in comfort level, based on teacher survey respondents' age, years teaching, or years using technology in their classes. Teachers who are less skilled with technology use tend to be afraid of failure and thus afraid to try new things.

It was noted that there must be a balance between encouraging teachers to take risks and try new things, and asking them to learn skills that they might consider to be too advanced, which could potentially result in them losing interest in the technology altogether.

> ***One of the biggest fears, I think is a teacher doing all the work to set it up, and not getting the results that they hoped for…so I think what the teachers do is they look at it and say, well, do the pros outweigh the cons, is this going to cost me so many hours… too much time, so there is a bit of fear, hesitation going into using the SuperNet, or something like that, because they don't want to get it all set up and have something not work.***

Teachers indicated that their frequency of technology use for instructional purposes had increased since SuperNet was implemented at their school $t(99) = -3.6$, $p=.001$ (two-tailed). A majority of teachers (62.6%) indicated that they are now using SuperNet as a teaching tool "at least once a week". In addition, a majority of teachers (51.5%) claim to have made changes to their teaching strategies as a result of having access to SuperNet. Figure 6 displays teachers' self-reported frequency of technology use prior to and after SuperNet implementation.

Figure 6

SuperNet Impact on Frequency of Technology Use for Instructional Purposes

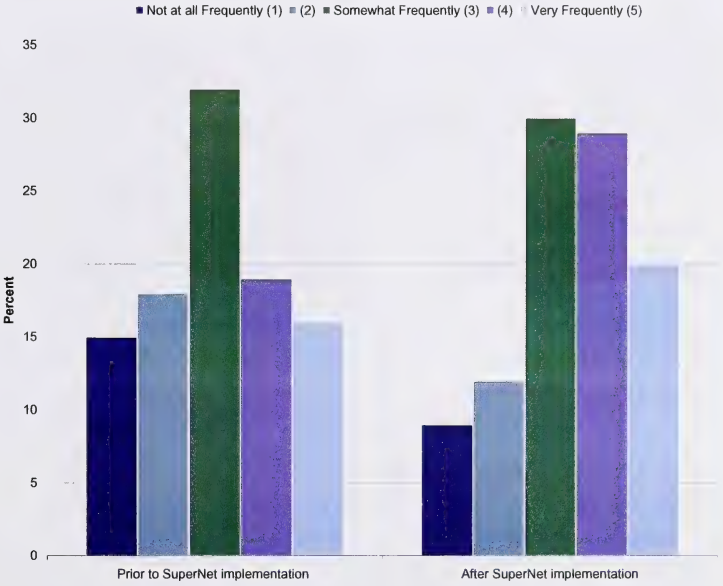


Figure 6: How often had you used technology for instructional purposes? (teacher survey)

A majority of teachers indicated that they were comfortable using technology for instructional purposes; self-reported levels of technology use were also increasing (see Figure 6). However, in practice, the extent to which various online technologies and resources were being used appears to be quite limited. Although overall use appeared to be quite limited, teachers in urban schools reported that they had used a higher number of the technologies listed in Table 3 than teachers in rural schools χ^2 (1, N=95)= 5.84, p=.02. Table 3 displays the frequency with which teacher survey respondents had used various online technologies or resources in their classes.

Table 3

Teacher Reported Frequency of Technology and Online Resource Use

Table 3: How frequently have you used each of the following activities/tools in your classes? (teacher survey)

Technology	Frequency of Use (% of respondents)				
	Have not used	Once every several months	Monthly	Weekly	Daily
Multimedia content	28.1	26.0	15.6	24.0	6.3
Web Quests	50.0	25.5	19.1	4.3	1.1
Streaming Video	50.0	17.0	22.3	7.4	3.2
Virtual Field Trips	65.3	20.0	12.6	2.1	0.0
Interactive whiteboards (e.g., Smartboards)	66.3	18.9	4.2	6.3	4.2
Website development tools (e.g., Dreamweaver or Frontpage)	67.4	10.5	11.6	7.4	3.2
Learning content management systems (e.g., Moodle or WebCT)	74.2	11.8	2.2	5.4	6.5
Instant Messaging	76.6	9.6	3.2	5.3	5.3
Blogs	77.4	17.2	1.1	4.3	0.0
Asynchronous communication tools (e.g., bulletin board or Listserve)	79.3	7.6	4.3	4.3	4.3
Webcasts	83.5	5.5	7.7	1.1	2.2
Social Software (e.g., Wikis, Myspace, or Furl)	84.9	7.5	2.2	4.3	1.1
Video conferencing	88.2	6.5	5.4	0.0	0.0
Podcasts	90.3	6.5	2.2	1.1	0.0
Synchronous communication tools (e.g., eLuminate or Centra)	92.2	7.8	0.0	0.0	0.0

Note. Results in this table are mean ranked. Those with the highest average reported frequency of use are listed first and those with the lowest last.

Overall usage rates appeared to be quite low for the technologies listed above; however, teachers showed relatively high levels of interest in incorporating these technologies into their future lessons (see Table 4). This may indicate that barriers present in the teaching environment (e.g., time constraints or inadequate access to technology) are limiting teachers' abilities to incorporate technologies and online resources into their classes and make fuller use of the SuperNet's capacity. When asked to rate their interest in, "incorporating the following online activities/tools into your classes", a

portion of respondents selected "unknown", which suggests they were either unfamiliar with the technology/resource or were unable to rate their interest level.

Table 4

Teacher Reported Interest in Using Technologies and Online Resources

Technology	Interest in Using (% of respondents)				
	Not at all Interested (1)	(2)	Somewhat Interested (3)	(4)	Very Interested (5)
Podcasts	22.7	8.0	20.5	10.2	20.5
Blogs (Weblogs)	22.6	18.3	19.4	10.8	17.2
Social Software (e.g., Wikis, Myspace, or Furl)	14.8	17.0	19.3	6.8	23.9
Synchronous communication tools (e.g., eLuminate or Centra)	14.0	11.8	20.4	12.9	22.6
Instant Messaging	29.3	10.9	14.1	10.9	27.2
Asynchronous communication tools (e.g., bulletin board or Listserve)	16.0	10.6	19.1	11.7	27.7
Learning content management systems (e.g., Moodle or WebCT)	14.3	9.9	14.3	14.3	29.7
Website development tools (e.g., Dreamweaver or Frontpage)	14.0	12.9	15.1	9.7	38.7
Webcasts	9.9	5.5	29.7	12.1	33.0
Interactive white boards (e.g., smartboards)	7.4	7.4	13.8	14.9	40.4
Web Quests	6.3	6.3	25.3	13.7	40.0
Streaming Video	3.2	5.4	21.5	15.1	45.2
Virtual Field Trips	4.2	4.2	16.8	18.9	49.5

Note. A 6th option (Unknown) was also available to participants and is not reported here. As a result, the row totals may not equal 100%.

Table 4: How interested would you be in incorporating the following online activities/tools into your classes (teacher survey)

In general, respondents indicated that a champion model of technology integration was an effective way to encourage technology use by teachers. If teachers witness their colleagues using technology effectively and easily in their classes, they will be more likely to feel comfortable with the idea of integrating it into their own teaching practice. Respondents indicated that passionate, knowledgeable staff were instrumental in encouraging teachers to take risks and in supporting them in the initial stages of technology implementation (see comment below).

> ***Part of it is helping teachers see their role differently, and promoting risk-taking, and promoting lifelong learning, and that kind of thing because teachers who are stuck in the belief that, you know they have to have all the answers and that they're going to stand and deliver ad nauseam are not able to embrace all of the possibilities, I think, that exist with technology. Teachers have to see themselves as learners, they have to be risk-takers…***

> ***they have to have opportunity to be engaged in learning the same way we expect kids to be engaged in learning.***

Participants indicated that the availability of in-class support for technology integration was a significant factor affecting technology use by teachers. This effect seemed to occur in schools that had implemented the champion model, as well as schools that were unable to implement the champion model, due to a lack of skilled staff. Respondents also commented that teachers need time to experiment with technology outside of the classroom in order to make the most effective use of the technology.

In addition to the availability of in-class technical support, another significant factor affecting teachers' knowledge of technology was reported to be their lack of time to partake in professional development activities, including informal learning opportunities. As teachers are already busy, they may have difficulties finding time to learn more about new technologies and how to incorporate them into the curriculum. In some schools, respondents indicated that more release time is needed for professional development around technology. One respondent commented that teachers at his/her school would prefer to give up PD opportunities because of the difficulties associated with finding a substitute teacher and its possible effect on meeting curriculum objectives. Some respondents indicated that, at their schools, one teacher would attend a workshop or PD session and then share this knowledge with other teachers, which helped to address teachers' lack of time to learn through formal professional development activities. This also supports the champion model of technology integration, where a skilled teacher can help support his or her colleagues as they begin to integrate new technologies in their classes. The comment below illustrates the challenges outlined in this section:

> ***We try to have tech leaders…but those people are teachers too, and they're quite busy as well too, and we sort of don't directly ask them, it just happens, right? If they're willing to do that, great, if they're not…The teachers really are on their own to help themselves, I try to step in to identify the ones that really need help that are sort of letting it slide 'cause they've got other things to worry about.***

In addition to a shortage of computers at certain schools, some respondents indicated that a lack of teacher skill was the most significant factor affecting the use of technology for learning. They reported that students have adequate access to computers, but that technology is not sufficiently integrated into the curriculum, and thus hardware resources are under-utilized. These points further support the need for skilled teachers who can make effective use of technology for learning. One respondent indicated that students tend to have more technological experience than their teachers and that this was affecting student learning:

> ***Some kind of online learner management systems would be really nice if teachers…being able to use PowerPoint or feel comfortable to present and have kids present…kids are pretty comfortable on computers and…I think they think that it's a natural way for them to learn and express…to demonstrate what they know, but because teachers aren't comfortable with it sometimes it doesn't happen as much as it could…***

ISTE Definition of Professional Development: District leaders and staff have consistent access to technology-related professional development for their job assignments.

3.3.5 Professional Development

In general, interview respondents indicated that there are adequate opportunities for formal professional development (technology-related), but that teachers need more training and encouragement in support of technology use in teaching and learning. Some respondents indicated that their release time is limited, and that their professional development focus tends to be on curriculum and not on technology. These comments are supported by responses to the teacher survey, where almost half of teachers strongly disagreed (25.0%) or disagreed (20.8%) that they, "have adequate training to make full use of the SuperNet's capacity in your classes". In some schools, more money is needed for substitute teachers and release time for teachers to undertake professional development activities. Teachers also need to be encouraged to select technology-specific learning activities because, in many cases, teachers make their own professional development decisions. One respondent emphasized the importance of allowing teachers to make their own professional development choices:

"...almost half of teachers strongly disagreed (25.0%) or disagreed (20.8%) that they, 'have adequate training to make full use of the SuperNet's capacity in your classes.' "

> ***It's more of that grass roots approach where the teachers aren't being told what to do…for professional development, in terms of technology, they are now finding and doing the research on their own and saying I need to go to this conference. Why? Because they're doing a great seminar here on how to use program X or how to incorporate this into the classroom, so that's exciting…it's now back into the hands of the teachers because they have the tools they need…***

In order to relieve some of the time pressure associated with formal professional development, in some cases one or two teachers would be sent to a workshop or session, and would bring this knowledge back to the school to share with others. Indeed, respondents indicated that they often learned informally from teachers with more technological experience than themselves, and that this process is important as it allows teachers to share their concerns and frustrations in addition to knowledge.

Again, respondents indicated that the champion model was the most useful method to encourage technology adoption and skill development. In this case, the champion can act as a model for other teachers, by stimulating interest and helping colleagues become comfortable with new technologies. Respondents emphasized the usefulness and practicality of embedding learning activities associated with professional development in the classroom. A staff member fully dedicated to helping teachers with technology integration could provide ongoing in-class support, and also encourage teachers to experiment with and practice using new technologies or resources. Almost all schools who did not have a technology integration specialist

indicated their desire to have someone fully dedicated to technology integration at their school. In addition to providing teachers with needed support for technology integration, informal, hands-on learning can help alleviate some of the issues surrounding lack of release time or funding for professional development.

According to interview participants, informal professional development - through conversations with colleagues - often provided them with the knowledge and support required to integrate technology more fully into their teaching and make better use of the SuperNet's capacity. However, based on responses to the teacher survey, it does not appear that this process of informal professional development is very common in the schools included in the SuperNet Snapshot. Table 5 provides an indication of the ways in which teachers were able to, "discuss best practices for the use of online activities in K-12 education". Of note is the finding that almost 50% of teachers do not even discuss best practices for online activities, "with other teachers at your school". This finding suggests that teachers would benefit from additional discussion and informal professional development surrounding the use of online activities and resources.

Table 5

Teacher Reported Methods for Discussing Best Practices for Online Activities

Table 5: Have you had the opportunity to discuss best practices for the use of online activities in K-12 education: (teacher survey)

Discussion Method	Percent who had used method
Through an online community of practice	29.0
With other educational experts (e.g., at conferences)	37.2
With other teachers in your area of specialization (e.g., grade level or subject area)	50.5
With other teachers at your school	53.7

Formal professional development activities varied between schools, and many respondents reported a mixture of formal and informal learning opportunities. Respondents indicated that professional development took place through videoconferencing, webcasts, online courses and tutorials, online chat, email, and phone calls. Respondents indicated that more communication between schools to share ways of incorporating technology use into the curriculum would be useful, as most of this knowledge is not disseminated outside of schools. It was suggested that this inter-school communication could be accomplished through videoconferencing. Finally, some respondents indicated that professional development specifically addressing technical skills, such as the use of interactive whiteboards and projectors, and techniques for resolving technical issues would be useful. Figure 7 displays participants' responses to several items on the teacher survey, which asked teachers to indicate how beneficial professional development would be in a number of areas.

Figure 7

Areas Where Teachers Felt they Would Benefit from Additional Professional Development

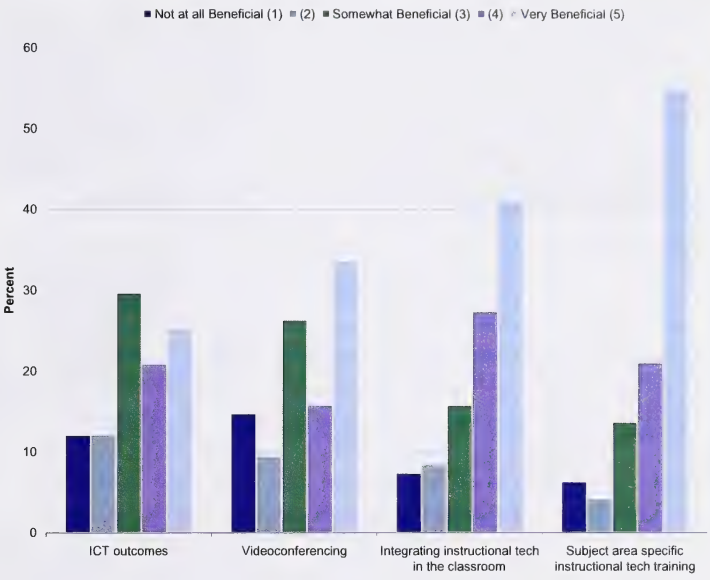


Figure 7: How beneficial do you feel additional professional development in the following areas would be? (teacher survey)

ISTE Definition of Technical Assistance:

Personnel have technical assistance for maintaining and using technology.

3.3.6 Technical Assistance

The availability of technical assistance varied greatly from school to school. There was some inconsistency between the reports of administrators and teachers/technical staff members. Administrators tended to perceive more timely and effective support than both teachers and technical staff members. Some larger schools had their own technical support person, whereas other schools tended to have support which was centralized in their jurisdiction. In some schools, a teacher (usually an early adopter) acted as the technical support person, and sometimes there was both a technical support expert as well as an early adopter available for support. Figure 8 displays teachers' responses when asked from where they typically received technical support for online activities.

Figure 8

Where Teachers Go for Technical Support

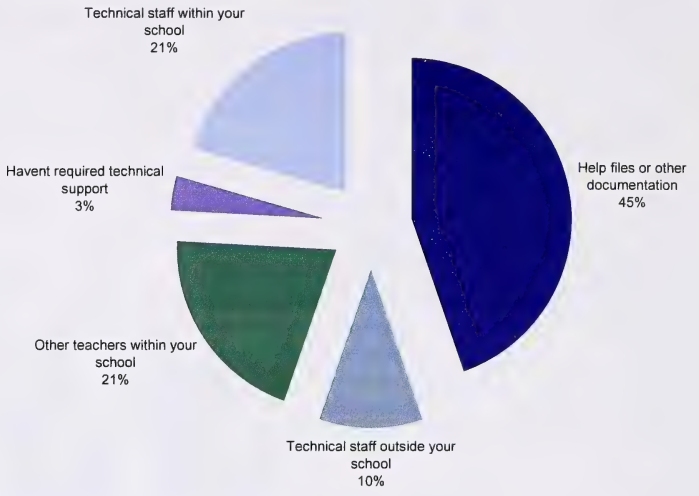

Technical staff within your school 21%
Havent required technical support 3%
Other teachers within your school 21%
Technical staff outside your school 10%
Help files or other documentation 45%

Figure 8: Where do you currently get technical support for online activities? (teacher survey)

Teachers appear to rely heavily on documentation and help files when they require technical support; however, students indicated that when they require technical support, they rely most frequently on their teachers and other students in their classes (see Figure 9).

Figure 9

Where Students Go for Technical Support

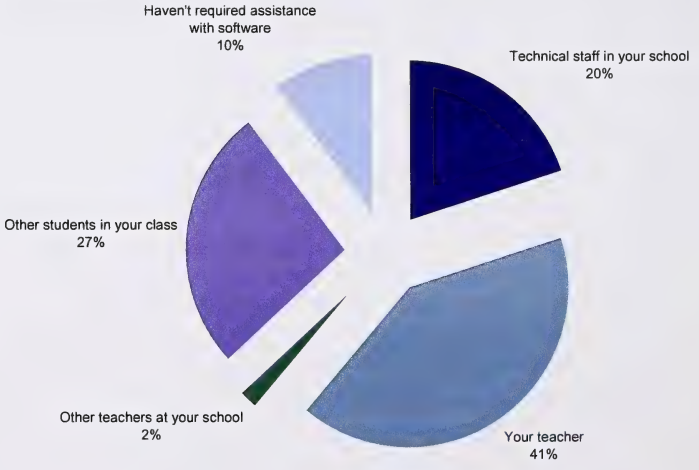

Haven't required assistance with software 10%
Technical staff in your school 20%
Other students in your class 27%
Other teachers at your school 2%
Your teacher 41%

Figure 9: If you need help using the computer, who do you usually ask for help? (student survey)

Several interview participants indicated that technical assistance and the availability of timely technical support plays a major role in the willingness of teachers to integrate technologies into their teaching, and make better use of SuperNet's capacity. Timely technical assistance enables teachers to take chances in their delivery and explore new technologies and online resources, while being secure in the knowledge that if problems occur, they will be handled in an appropriate amount of time. Respondents to the teacher survey echoed these comments by indicating that technical support was one of the most important factors, "in terms of their influence on your use of SuperNet applications in the classroom." A large majority of respondents felt that technical support was "important" (30.2%) or "very important" (46.9%) in terms of its influence on their use of SuperNet in the classroom.

Almost all schools that did not have a technology integration specialist indicated their desire to have someone fully dedicated to technology implementation at their school. Some larger jurisdictions had centralized departments that served this function. Other forms of support mentioned included a videoconferencing expert and a centralized help desk. Schools that had their own technical expert, or at least an early adopter for technical assistance, indicated more satisfaction with technical assistance than schools that relied solely on jurisdictional support staff (typically a shared LAN tech) for support. Respondents reported that the LAN techs were typically very busy and were often not able to respond immediately to their requests for assistance.

ISTE Definition of Content Standards and Curriculum Resources: Teachers, Instructional personnel, and school leaders are knowledgeable about content and technology standards, related ICT curriculum and resources and the use of technology to support learning.

3.3.7 Content Standards and Curriculum Resources

In order to maintain the non-evaluative focus of the SuperNet Snapshot research, no attempt was made to directly assess teachers' knowledge of their subject area or teaching methodologies. However, teachers' awareness and use of curriculum resources are well documented (see Table 3) and a very large majority of teacher survey respondents (91.6%) indicated that they had accessed online curriculum guides provided by Alberta Education; only 2.1% of teachers were not aware of the online curriculum guides. In addition, the SuperNet Snapshot site visits provided several examples of effective use of technology and curricular resources. For example, during one site visit Extension Learning Solutions witnessed the use of an interactive whiteboard and cordless headphones, to facilitate the use of a math game (located on the LearnAlberta.ca website) for two elementary school students who required extra practice. This was one of several highly engaging learning activities that we witnessed during the site visits.

Many respondents emphasized the importance of embedding technology in the curriculum, and indicated that technology skills should be incorporated into course content, which is a major goal of the Alberta ICT curriculum. It was indicated that technology helps to keep children's education current and relevant for the future. However, respondents also indicated that instructional practices that work well without the use of technology should not be discarded, and that intended learning outcomes should always be kept in mind when using technology in the class. The following is a sample of respondents' comments:

> ***Embedding multimedia…it's so effective to kids, like I can talk about, like Pythagorean theorem and draw, you know, a shaky triangle, but you know, to actually see it … someone else do it on video, right, and you know you're having all these images flash, like the kids, you know, they're interested in that, you'll see it, like, they are focused on that, whereas I'm talking…I'm hopefully getting as many kids as focused as possible…I won't get them all, but you watch from behind and I think the kids are just, you know, excited about that and that gets teachers motivated…***
>
> ***When we're trying to teach the culture of Brazil from a textbook that was published in 1988, long before these kids were even born…I would be pissed off if there was a country out there teaching the culture of Canada in the 80's right, cause we're clearly not wearing leg warmers, its not big hair anymore…and that's what culture is…***
>
> ***If we're going to teach kids how to do it properly we have to give them the right resources to do it…a lot of teachers, their answer to it is 'I don't accept any internet resources'…you can't do that, its not the best way to do that because the kids in this generation now are 110% behind technology. Internet now is for them what libraries were for the previous generation, and so my comment to teachers always is to support that – you need to incorporate that in your classroom and you need to learn how to work around it, and if you're not, you're going to lose those connections with their students that are going to allow real learning to take place.***

Interview responses associated with this Essential Condition indicate that teachers need additional assistance integrating technology into their classes. Respondents indicated that teachers simply don't have the time to search for online resources relevant to the curriculum, and they also need training on how to incorporate these resources into their classes. Some respondents indicated that online, easily accessible, good quality content should be kept on a website, either by the school district or by Alberta Education. Some of these respondents were likely not aware of the LearnAlberta.ca website, as it could potentially provide some of the resources that teachers were requesting. Additional professional development around technology

integration, more collaboration between teachers to share their knowledge, and help from a technology integration specialist were all suggested as ways of helping teachers integrate technology more fully into their teaching.

ISTE Definition of Student-Centered Teaching: Teaching in all settings includes the use of technology to facilitate student-centered approaches to learning.

3.3.8 Student-Centered Teaching

Many respondents emphasized the importance of embedding technology in the curriculum, and not considering technology skills separate from the course content. Respondents also perceived various benefits of technology use in their classes. Some of the perceived advantages of technology, in general, were that it helps to increase student interest in the curriculum and student motivation to learn. One respondent commented that ideally, at the beginning of classes, students should be presented with visual or audio stimulation to capture their attention and promote initial interest in the subject matter. This potential benefit of multimedia/online activities appears to be occurring. When asked how much online activities used in class increase both their interest in topics they are studying and the amount they learn, a large majority of students indicated that these activities provide at least "some increase" in both areas (see Figure 10).

Figure 10

Impact of Online Activities on Student Learning and Interest Levels

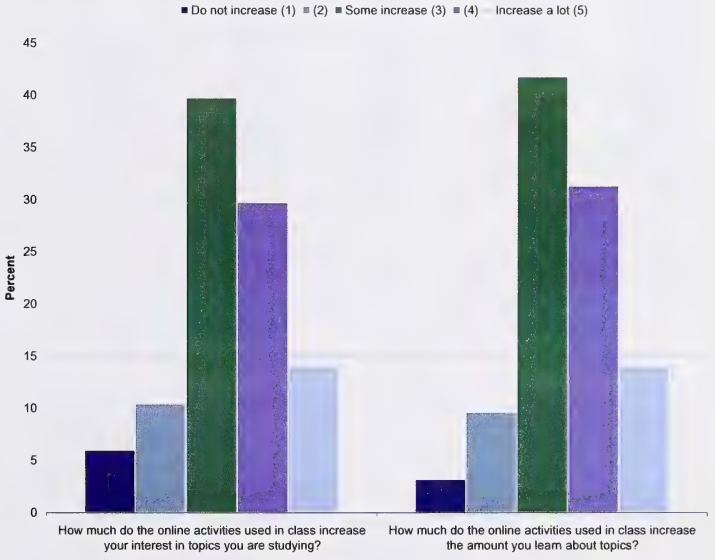


Figure 10: See chart for question text. (student survey)

Stimulation of the senses (i.e., with interactive whiteboards, projectors, or audio clips) was also seen as an advantage for physically disabled children, as they may have learning disabilities that could be at least partially ameliorated by various technologies. Respondents also commented that the use of technology can help to accommodate students' varied learning styles, for example, by allowing more advanced students to access online supplemental resources, thus permitting teachers to spend more time with struggling students. See the illustrative comment below:

> ***Students are interested in technology and it is part of their life. If education does not incorporate technology, we will miss an important opportunity to make connections with students…*** *(later on in the interview)* ***…The most important thing that I have is just seeing how focused kids are on technology and how it's so second nature to them, if we keep ignoring it and not funding it properly, they we're going to start getting this disconnect between education not being in tune with technology and kids coming into the building that are 100% in tune with technology, and that could be the one thing…that education makes connections with students…that just aren't accepting education, but they're accepting that technology, if we could get that…***

Respondents indicated that access to technology and the SuperNet helps to keep education current and relevant for the future. Respondents felt that technology allows students to learn the skills they need to become responsible citizens and that it makes them worldlier. One respondent referred to the Internet as a "living textbook" where students are able to more fully experience concepts that they are learning in class, and another respondent commented that the Internet allows students to travel places they might never physically be able to go. At some schools, students were already communicating with other students and experts across Canada or around the world. Videoconferencing technology at some rural schools allowed students to take classes that they would normally not be able to take, because of inflexible class offerings or teacher shortages. The comment below is illustrative of the above points:

> ***The technology should provide "time to think", and if, in an ideal world the SuperNet could do that, provide our students time to think…if it consumes the time, then that doesn't help us at all…because we already have a over-crowded curricula of minutia, trivia, things that we have to get kids, to essentially memorize that largely they won't need to know…communication is key, key, key, key, so we have students who are doing podcasts…listening to radio stations from around the world and doing things like that to increase their social studies, or science, or language arts…***

Teacher survey respondents indicated that they are making use of various technologies and online resources (see Table 3) that may be indicative of a student-centered approach to teaching and learning (e.g., blogs, social software, instant messaging, or podcasts).

The SuperNet is making it easier for teachers to help students take an active role in their own education. Online activities can help motivate students and encourage them to actively seek out opportunities to engage with the material through the use of the Internet or videoconferencing. Instead of trying to fill students with "minutia", the SuperNet can provide a means to make the content come alive for them. Teachers indicated that they are using SuperNet for various activities (see Figure 11) that suggest they are providing opportunities for students to construct knowledge either individually or as part of a group.

Figure 11

Use of SuperNet to Promote Student Interaction

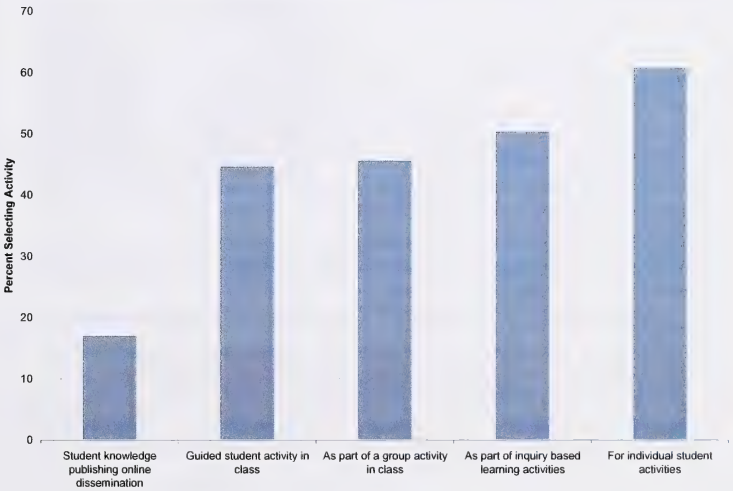


Figure 11: How are you currently using SuperNet in your classroom? (teacher survey)

The data presented in Figure 11 indicate that teachers are providing students with opportunities to use SuperNet both for individual and group activities. Although these activities are not necessarily representative of a student-centered or constructivist model of instruction, they may suggest a trend toward a constructivist approach. This is supported by the fact that a slight majority of teachers indicated they are using SuperNet as part of "inquiry-based learning activities" (see Figure 11). Although teachers appear to be making use of instructional activities that are congruent with a learner-centered or constructivist approach, responses from the student survey seem to indicate that didactic - rather than constructivist - approaches are still very common. Figure 12 indicates that the frequency with which teachers are using SuperNet for "presenting material to the entire class..." is still quite high.

Figure 12

Frequency of Student Interaction Styles While Using Technology

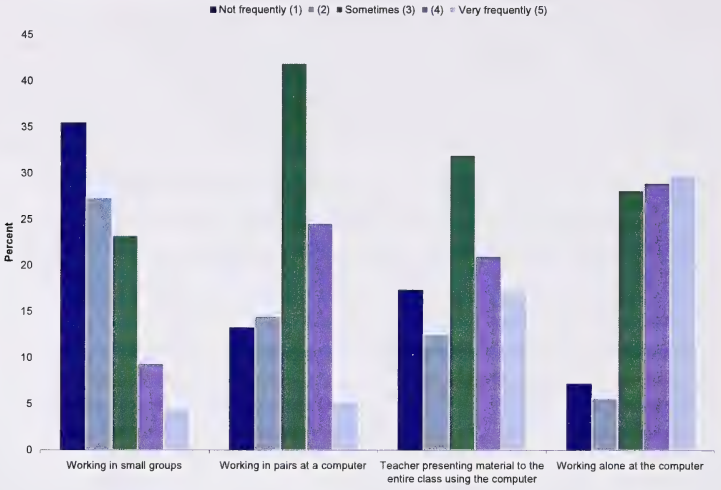


Figure 12: When you are using SuperNet in class, how often are you: (student survey)

Individualized learning was also acknowledged to be an advantage of the SuperNet. A number of respondents indicated that the SuperNet allows educators to move away from a teacher-centered approach; this allows student learning to be more exploratory and creates a learning environment where the teacher acts as a facilitator rather than a lecturer. For example, some respondents commented that project-based assignments involving Internet research allow students to learn on their own. Additionally, teachers believe that critical thinking skills are promoted by Internet research, as students (under the supervision of their teachers) learn how to critically assess online resources. A few respondents indicated that ideally, all students would have their own laptop, which would maximize their ability to become autonomous learners.

Although the majority of comments focused on the pedagogical benefits of technology, some respondents also indicated that practices that work well without the use of technology should not be discarded, and that technology should always be used while keeping the learning outcomes in mind. One respondent indicated that one problem associated with online learning is the lack of human contact. Furthermore, another respondent commented that allowing students to work at their own pace may widen the gap between the more advanced students and the struggling students.

ISTE Definition of Assessment and Accountability: The school and district has a system for the continual assessment of effective technology use for improving student learning.

3.3.9 Assessment and Accountability

When respondents were asked to comment on the assessment of the effectiveness of technology for teaching and learning, most respondents indicated that they were not sure what was being done, that nothing official was being done, or that assess-

ments had been performed by either their jurisdiction or another institution and that they were not aware of the results. Those respondents who indicated that they were aware of the results, or who indicated that their school had conducted a technology satisfaction survey, reported that parents and students felt that the school was not providing students with enough access to technology or not integrating it enough in the curriculum.

Based on comments during the teacher, administrator, and technical staff interviews, it appears that most schools involved in the SuperNet Snapshot have not made any systematic assessments of the effectiveness of technology and SuperNet use in the classroom. In several cases, jurisdiction-wide surveys – administered to parents and students – included questions on technology use in the school. However, these questions typically targeted access to and use of technology, rather than its effectiveness for learning enhancement or the pedagogical merit of the technologies. Although it would appear that most schools do not have formal processes in place to assess the effectiveness of instructional technologies, several teachers indicated that they often had informal discussions of the pedagogical merits of various technologies with their colleagues. These discussions between teachers often centered on best practices for online tools and resource use, and enabled teachers to share examples of effective technology integration in their classes.

Although some formal and informal assessment of the learning impact of technology use was present in the schools, each of the participating schools would likely have benefited from more rigorous and systematic assessment procedures. A more systematic approach to the evaluation of instructional technologies would have enabled the schools involved in the SuperNet Snapshot to better meet the assessment criteria described by the ISTE.

ISTE Definition of Support Policies: The school and district has policies, financial plans, and structures to support the use of technology in learning and in operations.

3.3.10 Support Policies

In general, respondents indicated that their school jurisdictions provide adequate technical support, but that more funding is needed for additional technology. Most of the comments regarding school jurisdiction support focused on hardware and funding. Respondents tended to be aware of their jurisdiction's evergreening (i.e., planned upgrading) plan or a set of hardware standards instituted by the jurisdiction; only a few respondents indicated that a plan was not in place. Although many schools indicated that these policies were in place, they also reported that they needed more funding for additional equipment, software, or technology-focused professional development. In addition, some respondents indicated that the distribution of funds between schools, especially between rural and urban schools was not appropriate; others commented that they wanted to have more input regarding where the funds were spent.

> ***Certainly because if the tech plan…which was basically forced on us, but you know, thank goodness it was, I think the next five years are going to be pretty exciting, and…what we***

> ***think are special right now will become the norm as we go along…should search for and strive for…to make technology just a part of everyday learning.***
>
> ***My teachers come with fantastic ideas, now, in order to implement those things from an administrator's perspective I say that's a great idea, but I hate…I always have to go "but", because…so…I think if Alberta Learning came out with a really strong, well-funded plan, with the proper resources, our division then would really be able to do what they wanted to do, and more importantly our teachers would be able to really grab on and say, "This is what I need".***

In most cases, respondents indicated that the school made the final decisions on how to spend the funding they received; some respondents indicated that their jurisdiction had a technology committee which made decisions on funding expenditures. A challenge reported in some schools was the scarceness of technology support. For example, schools in several jurisdictions shared LAN techs, who were not readily available to provide technical support. Other respondents, however, indicated that technical support was adequate as they were able to fund a specific support position within the school.

Other jurisdiction policies such as filtering and firewall settings also impacted a large portion of teacher respondents. Some interview respondents commented that firewalls put in place by some jurisdictions were limiting their access to the SuperNet. A majority of teacher survey respondents (65.3%) indicated that firewalls had hampered their ability to access content or use online technologies.

Although respondents indicated some awareness of goals for technology integration set by the jurisdiction, they did not discuss details of policies put in place to support technology integration, perhaps indicating a low level of awareness around these policies at the schools. Respondents from a few schools indicated that their jurisdiction was not providing adequate technology integration support for teachers in a number of areas: raising teacher awareness of the SuperNet, providing professional development around new technologies and technology integration, and providing access to a set of online resources. These teachers also indicated that more collaboration between schools would be useful for sharing knowledge related to technology integration.

IV DISCUSSION

The SuperNet Snapshot was intended to provide a general sense of how the SuperNet is currently being used in K-12 learning environments across the province of Alberta, and to establish baseline measures of SuperNet use in Alberta schools. The study provided an opportunity to determine whether access to SuperNet has impacted the ways in which teachers were able to use technology in their classes.

Several conclusions can be drawn from data collected at the 15 participating schools: the overall impact of SuperNet has been positive, and regardless of their current level of technology integration, each of the schools appeared to have benefited from access to SuperNet.

Although it might be tempting to make value judgments based on the perceived sophistication of SuperNet use (e.g., videoconferencing is a better use of SuperNet than web queries), these judgments discount the overall impact of SuperNet. For example, in schools such as the Genesis school, efficient access to online materials for instructional purposes was almost impossible prior to SuperNet implementation, due to the prevalence of low-bandwidth Internet connections in rural areas. This lack of access severely hampered the degree to which schools like the Genesis school were able to integrate technology into instructional practice. However, with the implementation of SuperNet, these schools received access to high-bandwidth Internet. Although their SuperNet usage - relative to other schools in the SuperNet Snapshot - may have been limited to less sophisticated and/or less bandwidth intensive activities (e.g., basic Internet searching and online resource use), this level of technology integration represents a major improvement over what was possible prior to SuperNet implementation. In other words, potentially the most useful index for determining the effects of the SuperNet on Alberta schools may be a school's relative advancement in technology integration since SuperNet implementation, rather than an absolute ranking of a school's current level of technology integration. As this study is only a snapshot of SuperNet use at one period in time, it should provide a baseline measure for future studies of SuperNet use.

One salient finding that arose from the site visits conducted by Extension Learning Solutions was the incredible inter-school and intra-school variation in levels of technology integration and SuperNet use. The case studies presented previously begin to illustrate the range of use that was present in the 15 schools participating in the SuperNet Snapshot. For example, all participants saw technology integration as an important component of instructional practice; however, opinions varied in terms of how, and to what extent, technology should be integrated. In several cases, highly involved administrators who provided clear direction regarding technology integration seemed to reduce the level of intra-school variation in teacher practice. By providing a clear direction for technology integration within a school, administrators were often able to focus resources (e.g., hardware and technical support) to provide improved support for teachers.

The effects of strong leadership in the area of technology integration were present in several schools participating in the SuperNet Snapshot; however, respondents generally indicated that a clear direction for technology integration was not present at the jurisdictional level. This perceived lack of a clear direction within jurisdictions may have contributed to the large amount of inter-school variation in both the type and degree of technology integration.

The ISTE's Essential Conditions provided a framework to analyze and interpret the data collected during the SuperNet Snapshot. Based on qualitative and quantitative data collected at each of the 15 participating schools, several assertions can be made regarding the degree to which the schools appeared to meet the principles outlined in the Essential Conditions. The interpretation of the degree to which schools met the Essential Conditions is clearly subjective; however, several researchers at Extension Learning Solutions agreed that, on average, schools were closest to meeting - but had not completely met - the principles outlined in the following Essential Conditions:

- **Shared Vision,**
- **Equitable Access,**
- **Skilled Personnel,**
- **Technical assistance, and**
- **Content standards and Curriculum Resources.**

In most cases, further work will be required for schools to meet the requirements of the following conditions:

- **Professional Development,**
- **Assessment and Accountability, and**
- **Support Policies.**

While the classroom observations and data from the student and teacher surveys appear to indicate that teachers are actively working toward a Student-Centered Teaching orientation, the "time slice" nature of the research project made it difficult to accurately assess this condition. A more involved assessment of teachers' pedagogical practices would be necessary to address the degree to which this Essential Condition was being met.

Even for those Essential Conditions which were closest to being met, changes could be made to better enable teachers and schools to successfully integrate technologies into teaching practice and make fuller use of SuperNet's capacity:

- **Shared Vision:** Many of the participating schools appeared to be meeting some of the basic elements required for shared vision, in the sense that all participants were supportive of technology integration. However, the presence of a clear direction for technology integration was often lacking at both the school and jurisdictional level. This lack of clear direction often impeded the degree to which individuals could provide proactive leadership to enable teachers to effectively integrate technology into their teaching.
- **Equitable Access:** Most respondents indicated that they would have benefitted from additional access to technology; although, criteria regarding the number of computers per student within a school ensured that all participating schools had at least a basic level of computing hardware (i.e., 6:1 student to computer ratio) available. SuperNet implementation also ensured that each school had adequate access to high bandwidth network and Internet connections.

However, there was a large amount of variation in access to "unconventional" hardware (e.g., videoconferencing equipment, interactive whiteboards, laptops, and Wi-Fi).

- **Skilled Personnel:** In general, teachers involved in the SuperNet Snapshot were fairly knowledgeable about technology use for learning. However, there was a great deal of variation between participating teachers, ranging from teachers who were comfortable using the Internet for basic research purposes, to teachers who were comfortable planning and executing multi-point videoconferencing events. This range suggests that a significant knowledge gap still exists between teachers, which could impact the degree to which they are able to make use of the SuperNet's capacity.
- **Technical Assistance:** Most participants indicated that they had adequate access to technical support to maintain the integrity and reliability of their school's technical infrastructure. Smaller urban schools and rural schools often reported that their technical support staff was shared among several schools within a jurisdiction; although, this did not appear to significantly impact their impressions of quality of service. Technical support for the purposes of maintaining a reliable technical infrastructure generally appeared to be adequate. However, when the definition of technical assistance is expanded slightly to include end-user support for hardware and software, the level of respondent satisfaction is reduced significantly. In-class support for technology integration was lacking in several of the schools included in the SuperNet Snapshot, and where support was available, it was typically informal (e.g., provided by another teacher) rather than formal.
- **Content Standards and Curriculum Resources:** Similar to "student-centered teaching", this Essential Condition is difficult to accurately evaluate without a more extensive assessment of teaching practice in each of the 15 participating schools. However, based on classroom observations and responses to the teacher survey, it appeared that teachers were generally knowledgeable in terms of content standards and curriculum resources. Awareness of online curriculum guides was very high, but several teachers indicated that they would appreciate a centralized storage location for online resources, which implies that they are unaware of sites like LearnAlberta.ca. This apparent lack of knowledge about online curriculum resources suggests that further communication may be required, to better publicize what resources are available to teachers.

The following three Essential Conditions represent areas where more work may be required in order for schools to fully address the principles for successful technology integration outlined by the ISTE:

- **Professional Development:** A majority of teachers who participated in the SuperNet Snapshot felt that they had adequate access to formal professional development opportunities related to technology use. However, various participants commented that the professional development opportunities

were often focused on the technology itself, rather than on the integration of technology in the classroom. Teachers felt that this style of professional development was not effective, because it did not adequately prepare teachers to effectively integrate the technologies into their classes. Teachers also indicated that while professional development opportunities were available, sessions related to technology use and integration were just one component of their ongoing professional development needs, which further limited their ability to access technology-focused professional development sessions. The required time commitment needed to attend professional development sessions further limited access, because teachers often indicated they were unwilling or unable to leave their classes to attend professional development sessions.

- **Assessment and Accountability:** Systematic procedures to assess the effectiveness of instructional technologies for learning were not in place in any of the 15 schools participating in the SuperNet Snapshot. While some schools had formal or informal procedures that partially addressed the assessment criteria, in general, these procedures were typically not adequate for assessing the effectiveness or learning impact of technology.
- **Support Policies:** In general, respondents indicated that their jurisdictions typically had policies in place to ensure a minimum level of hardware and technical support availability. However, as stated earlier, based on respondents' comments, there appeared to be a lack of clear direction for technology integration at the jurisdictional level. In several cases, jurisdictional policies also hampered teachers' abilities to make use of SuperNet in their classes. For example, firewalls and filtering software limited access to online resources and made it difficult to communicate (e.g., through videoconferencing) with other schools. In these jurisdictions, policy tended to be driven by security and legal concerns, rather than the pedagogical merit of the tools or resources.

4.1 Recommendations for Best Practice

The following recommendations are global in the sense that most will require action and participation by various levels of stakeholders (e.g., teachers, administrators, jurisdictions, and Alberta Education) in order to be successfully implemented.

- Increase formal assessment of the effectiveness of technology for learning. Both formative and summative assessments should be incorporated to provide information for strategic planning purposes, and also to inform the practice of the teachers who are using the technologies. Formative assessment procedures should be "safe" in the sense that teachers should feel comfortable to take risks with new technologies and potentially make mistakes without being judged by others.
- Focus on creating a clear direction for technology integration (rather than just a plan for evergreening) at the school and jurisdictional levels. For strategic

planning purposes, instructional application should drive the hardware resource allocation process, not vice versa. A clear direction for technology integration that is grounded in pedagogy will allow resources to be targeted at specific areas with proven instructional merit; increased formal assessment will be an integral component of this process.

- Continue to foster the champion model of technology adoption. Where individuals within the school do not have the skills to perform this role, external assistance may be required to act as a catalyst for technology integration. Once a strategic direction for technology integration has been identified, highly motivated individuals within the school should receive the training they need to act as champions and provide support for their colleagues.
- Increase access to unconventional hardware such as videoconferencing equipment and interactive whiteboards; focus on technologies with demonstrated pedagogical merit. This is currently the area where there is the greatest variation among schools and increased access would help to level the playing field in terms of what is possible with SuperNet.
- Provide teachers with access to professional development that is differentiated, targeted, and focused on providing them with examples of effective technology integration. Teachers need professional development for technology use that is integrated with the curriculum. This professional development could either be handled formally through teacher in-services or workshops, or informally, through additional release time to work with colleagues or participate in online communities of practice.
- Encourage teachers to take risks in the classroom. Teachers need to see themselves as lifelong learners in order to be able to take advantage of new technologies. Teachers need to be creative, and they need to understand that mistakes are okay.
- Increase technical assistance aimed at end-user support for technologies that teachers are using in the classroom. Teachers need to feel comfortable experimenting with technology and need to feel confident that if problems occur, they will have timely access to technical assistance.
- Ensure that jurisdictional policies are in the best interests of teachers and students, and do not hamper their use of SuperNet and their access to online resources. Jurisdictional support policies should give equal weight to the often competing needs of supporting technology integration and addressing legal and security concerns surrounding online resource use.
- Emphasize the importance of school- and jurisdiction-wide solutions to issues surrounding SuperNet use and technology integration. Where possible, teachers and administrators should work together to solve school-based technical problems and should actively disseminate the solutions to as large an audience as possible. This "whole school" approach Where collective solutions are not found or larger issues remain, this information should be communicated to

the district in a coordinated way. Knowledge should not remain only with the individual or school.

- Foster communication and collaboration among schools. Genesis schools could benefit greatly from the knowledge and experience of Pilot-Project and Champion-Driven schools. Schools that are at earlier stages of technology integration and SuperNet use should not operate in a vacuum, separate from the skills and knowledge generated by their peers.

4.2 Limitations of the Study

A potential limitation of the quantitative data collected during the SuperNet Snapshot is the under-representation of rural respondents; urban respondents constituted over 90% of individuals who participated in the student and teacher surveys. For this reason, the quantitative data should be interpreted with some degree of caution, because the prevalence of urban respondents suggests that the findings may not accurately represent rural schools.

Extension Learning Solutions was required to contact JTCs in each of the seven jurisdictions in order to generate a list of potential participating schools. As discussed above, the involvement of the JTCs in the school selection process may have introduced a source of bias, because the sampling was likely purposive in nature. In the future, this potential source of bias could be reduced by using either a random or stratified sampling plan, where the researcher selected schools and then worked with the JTCs to contact the schools and secure participation.

The SuperNet Snapshot was intended as a depiction of SuperNet use at a particular point in time. This is important for informational reasons and to provide suitable baseline data for future research. However, future research that allows for a longitudinal examination of SuperNet use would provide a more accurate picture of usage trends and potential future growth.

Final Summary Report Appendix

Alberta Education SuperNet Snapshot

Prepared for Alberta Education

April 12, 2007

Faculty of Extension

SuperNet Snapshot
Administrator Interview

Throughout this interview, we will be referring to "SuperNet". Alberta education has the following to say about the purpose of SuperNet, "Through SuperNet, Alberta will provide affordable high-speed network connectivity and Internet access to all schools..." (http://www.education.gov.ab.ca/technology/SuperNet/).

The SuperNet is designed to provide all schools with the capacity to use bandwidth intensive resources and technologies like streaming video, videoconferencing, or Flash applications. While some schools may have had commercial high-speed internet for several years, the SuperNet now provides high-bandwidth capability for all schools in the province.

For the purposes of this interview, when we refer to "SuperNet" we would like you to think about both the high-speed network connectivity and associated high-speed Internet access provided by SuperNet.

1. Could you please describe your school (i.e., number of students and staff, unique features, etc.).

2. Can you please provide some anecdotes of effective use of SuperNet's capacity (i.e., speed, bandwidth) in your school?

3. How do you think the increased use of technology to support learning – and in particular SuperNet – has altered pedagogy at your school?

    a. How have professional development needs for teachers and administrators changed due to this shift in pedagogy?
    b. How has this pedagogical shift impacted the way you support instructional technology use at your school?

4. What steps – if any – has your school, or your jurisdiction, taken to assess the effectiveness and learning impact of SuperNet applications?

5. Please describe your school's plan for implementing and making use of new technologies in the classroom.
    a. Does your jurisdiction have a coordinated plan for the implementation and use of new technologies in all schools within the jurisdiction?

6. Do you feel that your jurisdiction provides adequate support for your school to make full use of SuperNet and online applications?

7. How do you think your school can support teachers as they attempt to implement new technologies in their classes?

8. As an administrator, how do you think you can promote and support SuperNet use in your school?
    a. In your school district?

9. Do you feel that your school has adequate computer resources, technical support, and technical knowledge to make full use of SuperNet's capacity?

    a. If not, in what areas do you think additional support or resources are required?

10. Do you feel that teachers in your school have adequate ICT training and professional development opportunities to make full use of SuperNet's capacity?
    a. If not, in what areas do you think additional training or professional development would be beneficial?

11. Are there any constraints – in addition to ones mentioned previously – that you feel are limiting the potential of SuperNet use in your school?

12. If these constraints were removed, what is your ideal vision of SuperNet use?
    a. How do you think this ideal can be achieved?

13. How do you think Alberta Education and your school district can help to maximize the potential of SuperNet in Alberta schools?

14. Do you have any additional comments that you would like to make?

SuperNet Snapshot

Teacher Interview

Throughout this interview, we will be referring to "SuperNet". Alberta education has the following to say about the purpose of SuperNet, "Through SuperNet, Alberta will provide affordable high-speed network connectivity and Internet access to all schools..." (http://www.education.gov.ab.ca/technology/SuperNet/).

The SuperNet is designed to provide all schools with the capacity to use bandwidth intensive resources and technologies like streaming video, videoconferencing, or Flash applications. While some schools may have had commercial high-speed internet for several years, the SuperNet now provides high-bandwidth capability for all schools in the province.

For the purposes of this interview, when we refer to "SuperNet" we would like you to think about both the high-speed network connectivity and associated high-speed Internet access provided by SuperNet.

1. Overall, what is your opinion of SuperNet use in the classroom?

2. Can you please provide some anecdotes of effective use of SuperNet's capacity (i.e., speed, bandwidth), either from your classes or from your colleagues' classes?

3. What steps – if any – has your school, or your jurisdiction, taken to assess the effectiveness and learning impact of SuperNet applications (do you know of any evaluations of technology use in area schools)?

4. Please describe your school's plan for implementing and making use of new technologies in the classroom.
    a. Does your jurisdiction have a coordinated plan for the implementation and use of new technologies in all schools within the jurisdiction?

5. Do you feel that your jurisdiction provides adequate support for your school to make full use of SuperNet and online applications?

6. How do you think your school's administration and your school district can help to maximize the potential of SuperNet in Alberta schools?

7. Do you feel that you have adequate computer resources, technical support, technical knowledge, and support within your school to make full use of SuperNet's capacity?
    a. If not, in what areas do you think additional support or resources are required?

8. Do you feel that you have adequate professional development opportunities (e.g., pedagogy and technology training) to make full use of SuperNet's capacity?
    a. If not, in what areas do you think additional training would be beneficial?

b. Do you feel that you have continuing opportunities to improve your technical and pedagogical understanding of technology use in the classroom?

9. Are there any constraints – in addition to ones mentioned above – that you feel are limiting the potential of SuperNet use in your classes?

10. If these constraints were removed, what is your ideal vision of SuperNet use?
    a. How do you think this ideal can be achieved?

11. Overall, do you think SuperNet has made an impact on how you teach your classes?
    a. If yes, what are some specific examples of changes you have made?
    b. If no, why do you think that SuperNet hasn't impacted your teaching?

12. Do you feel that SuperNet use has provided opportunities for your students to engage in more independent exploratory learning?
    a. If not, why?
    b. If so, please provide some examples.

13. Have you had opportunities to discuss the use of SuperNet (or broadband) in the classroom with other teachers

14. In your opinion as a teacher, what do you think students' expectations are regarding the use of computers and online applications in the classroom (examples)?
    a. How have your students reacted to online applications that you have used in the classroom?

15. What are the major benefits of SuperNet for students in your classes?

16. Do you have any additional comments that you would like to make?

SuperNet Snapshot

Technical Staff Interview

Throughout this interview, we will be referring to "SuperNet". Alberta education has the following to say about the purpose of SuperNet, "Through SuperNet, Alberta will provide affordable high-speed network connectivity and Internet access to all schools..." (http://www.education.gov.ab.ca/technology/SuperNet/).

The SuperNet is designed to provide all schools with the capacity to use bandwidth intensive resources and technologies like streaming video, videoconferencing, or Flash applications. While some schools may have had commercial high-speed internet for several years, the SuperNet now provides high-bandwidth capability for all schools in the province.

For the purposes of this interview, when we refer to "SuperNet" we would like you to think about both the high-speed network connectivity and associated high-speed Internet access provided by SuperNet.

1. Do you have any examples of ways in which the capacity (i.e., speed, bandwidth) of SuperNet is being used at your school?

2. Do you feel that your school has adequate access to computer resources, technical support, technical knowledge, and support within the school and within the jurisdiction to make full use of SuperNet's capacity?
    a. If not, in what areas do you think additional support or resources are required?

3. With current resources, do you feel that the technical staff is able to respond quickly and effectively to technical problems at your school?

4. Are there any access issues related to firewalls or other filtering software that hinder SuperNet use?

5. Do you feel that teachers have adequate ICT training and professional development opportunities to make full use of SuperNet's capacity?
    a. If not, in what areas do you think additional training and professional development would be beneficial?

6. Please describe the technical environment at your school, in terms of type and amount of equipment available, access to equipment, technical support, etc. (this will hopefully involve a tour of the technical facilities available at the school).

Technology list may include:

- Videoconferencing equipment
- Smartboards
- Data projecrtors
- Laptops for student use
- Laptops for teacher use
- Desktop computers
- Wifi
- Access to computers in classrooms for teachers
- Specialized software (e.g., Dreamweaver, photoshop, etc.)

SuperNet Snapshot
Initial Teacher Survey

Throughout this survey, we will be referring to "SuperNet" which is a provincial high-bandwidth internet connection available in Alberta schools. The SuperNet is designed to provide all schools with the capacity to use bandwidth intensive resources and technologies like streaming video, videoconferencing, or Flash applications. While some schools may have had commercial high-speed internet for several years, the SuperNet now provides high-bandwidth capability for all schools in the province.

Knowledge/comfort with online technologies

1. Prior to the implementation of SuperNet, how often had you used technology for instructional purposes?				
Not at all Frequently		Somewhat Frequently		Very frequently
1	2	3	4	5

2. Since the implementation of SuperNet, how often had you used technology for instructional purposes?				
Not at all Frequently		Somewhat Frequently		Very frequently
1	2	3	4	5

3. How comfortable are you using technology for instructional purposes.				
Not at all comfortable		Somewhat comfortable		Very comfortable
1	2	3	4	5

Access and Equipment

4. What is the average number of students in your classes?	
	Students

5. How would you rate the adequacy of computer **equipment** at your school?				
Not at all adequate		Somewhat adequate		Very adequate
1	2	3	4	5

6. What additional equipment would you like in order to make full use of SuperNet's capacity?

7. How would you rate the adequacy of computer **access** at your school?				
Not at all adequate		Somewhat adequate		Very adequate
1	2	3	4	5

8. Based on your experience using online activities in class, how would you rate the adequacy of SuperNet's speed?				
Not at all adequate		Somewhat adequate		Very adequate
1	2	3	4	5

9. Would you agree that your classes have **adequate access** to the following types of computer resources:					
	Strongly disagree		**Neutral**		**Strongly agree**
Computer labs (during class)	1	2	3	4	5
Computer labs (outside of class time)	1	2	3	4	5
Computers in the classroom	1	2	3	4	5
Mobile computers (e.g., on cart)	1	2	3	4	5
Interactive whiteboards (i.e., smartboards)	1	2	3	4	5
Videoconferencing equipment	1	2	3	4	5
Other, please specify and rate the resource according to the scale above.	1	2	3	4	5

10. On average, how many hours per week do you have access to computers in a lab environment for instructional purposes?	
	Hours

11. What is the typical student to computer ratio in the lab environment?	
	Students per computer

12. On average, how many hours per week do you have access to computers in your school, outside a lab setting (e.g., mobile computing station or in the classroom) for instructional purposes?	
	Hours

13. What is the typical student to computer ratio outside a lab setting (e.g., mobile computing stations or computers in the classroom)?	
	Students per computer

14. How difficult is it for you to schedule ad hoc computing resources for your classes?				
Not at all difficult		Somewhat difficult		Very difficult
1	2	3	4	5

15. In order to make full use of SuperNet, how important is access to the following types of technology in your classes:					
	Not at all important		**Somewhat important**		**Very important**
Data projector	1	2	3	4	5
Laptops for teachers	1	2	3	4	5
Laptops for students	1	2	3	4	5
Interactive whiteboards (i.e., smartboards)	1	2	3	4	5
Videoconferencing equipment	1	2	3	4	5
Other, please specify and rate according to the scale above.	1	2	3	4	5

16. Do you have access to a laptop computer at school?	
a.	Yes (whenever needed)
b.	No
c.	Sometimes (not consistently)

17. If so, could you please provide examples of how you have been able to use the laptop for educational purposes?

18. Are you able to access your school's network (e.g., files on the server) from your home?	
a.	Yes
b.	No
c.	Not sure
d.	Have not yet tried

19. What type of internet connection do you have at home?	
a.	High speed (e.g., DSL, Cable, or satellite)
b.	Low speed (e.g.,, dial-up)
c.	No internet connection
d.	Not sure

Delivery

20. How important are the following SuperNet attributes for your teaching context:					
	Not at all important		Somewhat important		Very important
Quick download times	1	2	3	4	5
Ability to videoconference over SuperNet	1	2	3	4	5
Ability to audioconference over SuperNet	1	2	3	4	5
Ability to stream high quality video	1	2	3	4	5
Ability to access interactive animations/simulations	1	2	3	4	5
Other, please specify and rate this attribute according to the scale above.	1	2	3	4	5

21. How frequently do you use SuperNet as a teaching tool?	
a.	Daily
b.	Several times a week
c.	At least once a week
d.	At least once a month
e.	Not at all

22. Please rate the importance of the following factors in terms of their influence on your use of SuperNet applications in the classroom:					
	Not at all important		Somewhat important		Very important
Technical support	1	2	3	4	5
Your comfort level with technology	1	2	3	4	5
Availability of appropriate content	1	2	3	4	5
Ease of locating appropriate content	1	2	3	4	5
Access to technology resources (e.g., smartboards, computers, etc.)	1	2	3	4	5
Class size	1	2	3	4	5
Professional development (in ICT use)	1	2	3	4	5
Student expectations	1	2	3	4	5

23. Approximately when was SuperNet implemented in your school?	
	Date (MM/YY)

24. Are the computers in the following areas connected to a central network at your school (e.g., to store files or access network printers)?			
Computers in lab environment	Yes	No	Planned for future
Computers in the classroom	Yes	No	Planned for future
Mobile computing equipment (e.g., laptops, computing carts, etc.)	Yes	No	Planned for future
Other, please specify	Yes	No	Planned for future

25. Do you have wireless access to SuperNet and your school's internal network in the following locations?			
In computer labs	Yes	No	Planned for future
In you classroom	Yes	No	Planned for future
In the school library	Yes	No	Planned for future
In school common areas (e.g., cafeteria)	Yes	No	Planned for future
Other, please specify	Yes	No	Planned for future

Pedagogical approach

26. Have you made changes to your teaching strategies as a result of access to SuperNet?	
a.	Yes
b.	No
c.	Not sure

27. If you answered "yes" above, please indicate how you altered your teaching strategies.

28. If applicable, how are you currently using SuperNet in your classroom (Please select all that apply)?	
a.	As part of a teacher led lesson
b.	For individual student activities
c.	As part of a group activity in class
d.	To find teaching resources
e.	Guided student activity in class
f.	As part of inquiry based learning activities
g.	As part of a homework assignment
h.	Student knowledge building
i.	Student knowledge publishing (online dissemination)
j.	Connecting with subject matter experts
k.	Other, please specify

29. Would you agree that SuperNet has provided more opportunities for your students to collaborate:					
	Strongly disagree		Neutral		Strongly agree
With other students in their classes	1	2	3	4	5
With other students at their school	1	2	3	4	5
With students at other schools	1	2	3	4	5
With other individuals in the community (e.g., contacting an expert to complete an assignment)	1	2	3	4	5

30. Please give some specific examples of how you are using SuperNet in your classes.

31. What constraints – if any – limit your use of SuperNet applications in your classes?

32. If the above constraints were removed, please describe your ideal vision of SuperNet use in your classes.

33. How frequently have you used each of the following activities/tools in your classes?

	Have not used	Once every several months	Monthly	Weekly	Daily
Multimedia content	1	2	3	4	5
Virtual Field Trips	1	2	3	4	5
Web Quests	1	2	3	4	5
Webcasts	1	2	3	4	5
Streaming video	1	2	3	4	5
Video conferencing	1	2	3	4	5
Asynchronous communication tools (e.g., bulletin board or Listserve)	1	2	3	4	5
Synchronous communication tools (e.g., eLuminate or Centra)	1	2	3	4	5
Social Software (e.g., Wikis, Myspace, or Furl)	1	2	3	4	5
Blogs	1	2	3	4	5
Instant Messaging	1	2	3	4	5
Podcasts	1	2	3	4	5
Learner content management systems (e.g., Moodle or WebCT)	1	2	3	4	5
Website development tools (e.g., Dreamweaver or Frontpage)	1	2	3	4	5
Interactive whiteboards (i.e., smartboards)	1	2	3	4	5
Other, please specify and rate this tool according to the frequencies listed above.					

34. Compared to their usage prior to SuperNet implementation, how frequently do your students use e-mail for the following activities during school time (if you are unsure, please skip the item)?

	Do not use	Much less frequently		About the same		Much more frequently
Communicating with their teachers	0	1	2	3	4	5
Communicating with other students	0	1	2	3	4	5
Contacting subject matter experts for school projects	0	1	2	3	4	5

Sending homework files home	0	1	2	3	4	5

35. Do you monitor student access to email during class time?	
a.	Yes
b.	No

36. How frequently do you assign homework that could require students to access the internet outside of school time?	
a.	Daily
b.	Several times a week
c.	At least once a week
d.	At least once a month
e.	Not at all

Professional development

37. Would you agree that you have adequate training to make full use of SuperNet's capacity in your classes?				
Strongly disagree		Neutral		Strongly agree
1	2	3	4	5

38. How beneficial do you feel ***additional*** professional development in the following areas would be?					
	Not at all beneficial		Somewhat beneficial		Very beneficial
Videoconferencing	1	2	3	4	5
ICT outcomes	1	2	3	4	5
Integrating instructional technologies in the classroom	1	2	3	4	5
Subject area specific instructional technology training	1	2	3	4	5
Other, please specify and rate this professional development according to the scale above.					

39. Have you had the opportunity to discuss best practices for the use of online activities in K-12 education:		
With other teachers at your school	Yes	No
With other teachers in your area of specialization (e.g., grade level or subject area)	Yes	No
With other educational experts (e.g., at conferences)	Yes	No
Through an online community of practice	Yes	No
Other, please specify	Yes	No

40. Have you had the opportunity to access the online curriculum guides provided by Alberta Education?	
a.	Yes
b.	No
c.	Was not aware of online guides

Technical support

41. Where do you currently get technical support for online activities?	
a.	Technical staff within your school
b.	Technical staff outside your school
c.	Other teachers within your school
d.	Students in your classes
e.	Help files or other documentation
f.	Haven't required technical support

42. What additional types of support would be useful in order for you to make full use of SuperNet's capacity?

43. How readily can **you and your students** get technical help when you need it?					
	No access to support		Some access to support		Constant access to support
In a lab setting	1	2	3	4	5
In the classroom	1	2	3	4	5
Other, please specify	1	2	3	4	5

44. Have you had difficulty accessing online content or using broadband-enabled technologies due to firewalls or other filtering methods?	
a.	Yes
b.	No
c.	Not sure

45. If so, please describe the issue(s) you have encountered?

Future SuperNet usage

46. How interested would you be incorporating the following online activities/tools into your classes?						
	Not at all interested		Somewhat interested		Very interested	Unknown
Multimedia content	1	2	3	4	5	6
Virtual Field Trips	1	2	3	4	5	6
Web Quests	1	2	3	4	5	6
Webcasts	1	2	3	4	5	6
Streaming video	1	2	3	4	5	6
Video conferencing	1	2	3	4	5	6
Asynchronous communication tools (e.g., bulletin board or Listserve)	1	2	3	4	5	6
Synchronous communication tools (e.g., eLuminate or Centra)	1	2	3	4	5	6
Social Software (e.g., Wikis, Myspace, or Furl)	1	2	3	4	5	6
Blogs (Weblogs)	1	2	3	4	5	6
Instant Messaging	1	2	3	4	5	6
Podcasts	1	2	3	4	5	6
Learner content management systems (e.g., Moodle or WebCT)	1	2	3	4	5	6
Website development tools (e.g., Dreamweaver or Frontpage)	1	2	3	4	5	6
Interactive whiteboards (i.e., smartboards)	1	2	3	4	5	6

Add other specify

Demographics

47. What grade level(s) do you currently teach?	
	Grade

48. If applicable, what is your area of specialization (e.g., grade level or subject area)?	
	Specialization

49. Is your school primarily:	
a.	Urban
b.	Rural

50. What is the name of your school (this will only be used to compare your responses to data from the site visit to your school)?	
	School

51. You are:	
a.	Male
b.	Female

52. What is your age.	
a.	20-24
b.	25-29
c.	30-34
d.	35-39
e.	40-49
f.	50 or over

53. How many years have you been teaching:	
	Years

54. For approximately how long have you been using computers and the Internet in your classes?	
	Years

55. Do you have any additional comments about SuperNet usage in your school or in your classes?

SuperNet Snapshot
Student Survey

Section 1 – Experience with Technology

1. How often do you participate in the following computer activities at home or at school:

	Not Frequently		Sometimes		Very Frequently	Don't use/ Don't know
Instant messengers (e.g., MSN, AOL)	1	2	3	4	5	9
Chat boards/rooms	1	2	3	4	5	9
Read Blogs (Web logs)	1	2	3	4	5	9
Post to Blogs (Web logs)	1	2	3	4	5	9
Download music	1	2	3	4	5	9
Download podcasts	1	2	3	4	5	9
Create and upload podcasts	1	2	3	4	5	9
Use a webcam	1	2	3	4	5	9
Use audio over IP (use a microphone to talk to others over the internet)	1	2	3	4	5	9
Maintain my own website	1	2	3	4	5	9
Play games	1	2	3	4	5	9
Use email	1	2	3	4	5	9

Section 2 - Impressions of SuperNet Applications

2. How often do your teachers use the following activities/tools in your classes?

	Do not use	Once every several months	Monthly	Weekly	Daily
Multimedia content (e.g., movies or animations)	1	2	3	4	5
Virtual Field Trips	1	2	3	4	5
Web Quests	1	2	3	4	5
Webcasts (live video of someone doing a presentation)	1	2	3	4	5
Streaming video	1	2	3	4	5
Video conferencing	1	2	3	4	5
Bulletin boards or Listservs or similar communication tools	1	2	3	4	5
Online conferencing tools (e.g., eLuminate or Centra)	1	2	3	4	5
Community Software (e.g., Wikis, Myspace, or Furl)	1	2	3	4	5
Blogs (Weblogs)	1	2	3	4	5
Instant Messaging	1	2	3	4	5
Podcasts	1	2	3	4	5
Learner content management systems (e.g., Moodle or WebCT)	1	2	3	4	5
Website development tools (e.g., Dreamweaver or Frontpage)	1	2	3	4	5
Interactive whiteboards (i.e., smartboards)	1	2	3	4	5

3. How often do you use the SuperNet to work with:

	Not at all frequently		Somewhat frequently		Very frequently
Other students in **your classes**	1	2	3	4	5
Other students at **your school**	1	2	3	4	5
Students at **other schools**	1	2	3	4	5
Other **people in the community** (e.g., contacting an expert to complete an assignment)	1	2	3	4	5

Section 3 – Technical Support

4. If you need help using the computer (e.g., have a question about using PowerPoint) for school activities, who do you usually ask for help? (Please choose only one)

a.	Technical staff in your school
b.	Your teacher
c.	Other teachers at your school
d.	Other students in your class
e.	Haven't required assistance with software

5. Do you agree that you have enough access to the following types of computer equipment:

	Strongly disagree		Neutral		Strongly agree
Computer labs (during class)	1	2	3	4	5
Computer labs (outside of class time)	1	2	3	4	5
Computers in the classroom	1	2	3	4	5
Mobile computers (e.g., on cart)	1	2	3	4	5
Videoconferencing equipment	1	2	3	4	5
Interactive whiteboards (i.e., smartboards)	1	2	3	4	5
Other, please specify	1	2	3	4	5

Section 4 – Impressions of Technology Use

6. Overall, what is your opinion of the online activities (e.g., watching video online, or visiting websites) used in your classes?

Very negative		Neutral		Very positive
1	2	3	4	5

7. How much do the online activities used in class increase your interest in topics you are studying?

Do not increase		Some increase		Increase a lot
1	2	3	4	5

8. How much do the online activities used in class increase the amount you learn about topics?

Do not increase		Some increase		Increase a lot
1	2	3	4	5

9. When you are using SuperNet in class, how often are you:

	Not Frequently		Sometimes		Very Frequently
Working alone at the computer	1	2	3	4	5
Working in pairs at a computer	1	2	3	4	5
Working in small groups	1	2	3	4	5
Teacher presenting material to the entire class using the computer	1	2	3	4	5

Section 5 - SuperNet in the classroom

10. How interested are you in using the following activities/tools in your classes?

	Not at all interested		Somewhat interested		Very interested
Multimedia content	1	2	3	4	5
Virtual Field Trips	1	2	3	4	5
Web Quests	1	2	3	4	5
Webcasts	1	2	3	4	5
Streaming video	1	2	3	4	5
Video conferencing	1	2	3	4	5
Asynchronous communication tools (e.g., bulletin board or Listserve)	1	2	3	4	5
Synchronous communication tools (e.g., eLuminate or Centra)	1	2	3	4	5
Social Software (e.g., Wikis, Myspace, or Furl)	1	2	3	4	5
Blogs (Weblogs)	1	2	3	4	5
Instant Messaging	1	2	3	4	5
Podcasts	1	2	3	4	5
Learner content management systems (e.g., Moodle or WebCT)	1	2	3	4	5
Website development tools (e.g., Dreamweaver or Frontpage)	1	2	3	4	5
Interactive whiteboards (i.e., smartboards)	1	2	3	4	5

11. What other types of online activities would you like to see used in your classes?

Section 6 – Demographics

12. You are:

a.	Female
b.	Male

13. What type of internet access do you have at home?

a.	High-speed (cable, ADSL)
b.	Low-speed (dial-up)
c.	No internet access at home
d.	Don't Know

14. Do you have any additional comments about using SuperNet in your school or in your classes?

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